



केंद्रीय भूमि जल बोर्ड

जल संसाधन, नदी विकास और गंगा संरक्षण मंत्रालय

भारत सरकार

CENTRAL GROUND WATER BOARD

Ministry of Water Resources, River Development &
Ganga Rejuvenation
Government of India

AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN

PARTS OF SOLAPUR DISTRICT, MAHARASHTRA

AAP 2016-2017, 2017-18 and 2019-20

मध्यक्षेत्र, नागपुर / Central Region, Nagpur

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**AQUIFER MAPS AND GROUND WATER MANAGEMENT PLANS,
SOLAPUR DISTRICT, MAHARASHTRA
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SOLAPUR DISTRICT AT A GLANCE

1. GENERAL INFORMATION		
Geographical Area	:	14,895 Sq. Km.
Administrative Divisions (2011)	:	Taluka-11; Solapur North, Malshiras, Pandharpur, Barshi, Madha, Sangole, Akkalkot, Mohol, Solapur South, Karmala and Mangalvedhe.
Villages	:	1,146
Population	:	43,17,756
Average Annual Rainfall (2010-2019)	:	488.8 mm
Rainfall 2019	:	547.7 mm (Min. 415.6 mm at Pandharpur to Max. 645.8 mm at Solapur)
Normal rainfall (1901-1919)	:	528.6 mm (Malshiras) to 766.8 mm (Akkalkot)
Long term rainfall Trend (1901-1919)	:	-17.944m/year (Mohol taluka) to 0.93 m/year (Sangola taluka)
2. GEOMORPHOLOGY		
Major Physiographic unit	:	Valleys, Denudational Hills (Sahaydri), Highly Dissected Basaltic Plateau, Moderately Dissected Basaltic Plateau, and Moderately Dissected Basaltic Plateau
Major Drainage	:	Bhima River and major tributaries of Bhima river are Nira, Sina and Man rivers.
3. LAND USE (2010-11) (sources: mahasdb.maharashtra.gov.in/district Report)		
Forest Area	:	342.00Sq. Km.
Non-Cultivation Area	:	788.97 Sq. Km.
Cultivation Area	:	11315.22 Sq. Km.
GW Irrigated Area	:	1788.09 Sq. Km.
4. SOIL TYPE	:	Medium to deep black soil and deep brown to red soil (Regur).
5. PRINCIPAL CROPS (source: KVK, Solapur)		
Cereals	:	7619 sq. km.
Pulses	:	872 sq. km.
Oil Seeds	:	619 sq. km.
Fruits	:	445.55 sq. km.
6. IRRIGATION BY DIFFERENT SOURCES (2013-14) – Nos. / Potential Created (ha)		
Dugwells	:	7873/ 20809
Tubewells/Borewells	:	324 / 1092
Other Minor Surface Sources	:	609 / 43059
Net Irrigated Area	:	65060 ha
7. GROUND WATER MONITORING WELLS (2019)		
Dugwells	:	Monitoring (KOW+NHS) - 323
Piezometers	:	01
8. GEOLOGY		
Recent	:	Alluvium
Up Cretaceous-Lr Eocene	:	Basalt (Deccan Traps)
9. HYDROGEOLOGY		
Water Bearing Formation	:	Alluvium- Sand & silt Basalt (Deccan Traps) weathered, fractured, jointed.
Premonsoon Depth to Water Level (May-2017)	:	4.5 to 28.5 mbgl
Postmonsoon Depth to Water Level (Nov.-2017)	:	0.5 to 18.5 mbgl

	Premonsoon Water Level Trend (2008-2017)	:	Rise: 0.34 to 0.007 m/year Fall: 0.004 to 0.67 m/year
	Postmonsoon Water Level Trend (2008-2017)	:	Rise: 0.009 to 0.34 m/year Fall: 0.001 to 0.42 m/year
10. GROUND WATER EXPLORATION (As on March 2017)			
	Wells Drilled	:	EW-88, OW-9, Pz-1
	Depth Range	:	44 to 205.25 mbgl
	Discharge	:	0.025 -18.88 lps
	Storativity	:	3×10^{-6} to 1.7×10^{-3}
	Transmissivity	:	0.8 to 130m ² /day (Basalt)
11. GROUND WATER QUALITY			
	Good and suitable for drinking and irrigation purpose, except Nitrate and Fluoride affected locations for drinking purpose.		
	Type of Water	:	Basalt- Ca-HCO ₃
12. DYNAMIC GROUND WATER RESOURCES- (2017)			
	Annual Extractable Ground Water Recharge (ham)	:	137267.20 ham
	Current Annual Ground Water Extraction (ham) (Irrigation + Domestic+ Industrial)	:	107574.53 ham
	Projected Demand (Domestic + Industrial)	:	5642.17 ham
	Stage of Ground Water Extraction (%)	:	78.37%
	Overall Category	:	Semi Critical
13. MAJOR GROUND WATER PROBLEMS AND ISSUES			
	The entire district comes under the rain shadow area. Rainfall is uncertain and scanty. The average rainfall for the district is 541 mm and classified as Drought Prone area. Decadal water level trend (2008-17) reveals that during pre-monsoon period 68 % of the area and during post monsoon period, 78 % of the area are showing decline in water levels. The Basaltic rocks, due to poor storage and transmission capability, get fully saturated during monsoon and desaturated early in summer. These aquifers also drain naturally due to high ground water gradient formed by sloping and undulating topography. Wide range of problems were faced during drilling operations due to caving formation (red bole) and loss of drilling medium.		
14.	Aquifer Management Plan		
	Supply side Management		Proposed AR structures: 940 Percolation Tanks and 2690 Check dams. The expected recharge every year from these structures is 201.7 MCM.
	Demand side Management		A total of 334 sq. km area of sugarcane and 10.3 sq. km. area of onion crop, which is under groundwater irrigation is proposed to be covered by Drip irrigation. Total water saved by implementing Drip irrigation would be 193.06 MCM.
	Development plan		Proposed 16791 Dugwells and 1462 Borewells in phased manner for 6 years to bring additional 337.49 sq. km. area under assured ground water irrigation

AQUIFER MAPS AND GROUND WATER MANAGEMENT PLANS, SOLAPUR DISTRICT, MAHARASHTRA

CONTENTS

1. INTRODUCTION	5
1.1 About the Area	5
1.2 Geomorphology, Drainage, Land Use and Soil Types	10
1.3 Climate and Rainfall	13
2. GEOLOGY AND HYDROGEOLOGY.....	17
2.1 Geology	17
2.2 Hydrogeology	19
2.2.1 Major Aquifer Systems.....	19
2.2.2 Aquifer Parameters.....	27
2.2.3 3-D and 2-D Aquifer Disposition	27
3. WATER LEVEL SCENARIO	31
3.1 Depth to water level (Shallow Aquifer-I)	31
3.1.1 Depth to Water Level – Pre-monsoon (May-2017)	31
3.1.2 Depth to Water Level – Post monsoon (Nov-2017).....	31
3.1.3 Seasonal Water Level Fluctuation (May 2017 vs Nov. 2017)	33
3.2 Depth to water level (Deeper Aquifer-II).....	34
3.2.1 Premonsoon Depth to Water Level (May-2017)	34
3.2.2 Post-monsoon Depth to Water Level (Nov.-2017)	34
3.3 Water Level Trend (2008-2017)	36
3.3.1 Pre-monsoon water levels trend.	36
3.3.2 Post-monsoon water levels trend.....	37
3.4 Hydrograph Analysis.....	38
4. GROUND WATER QUALITY	43
4.1 Electrical Conductivity (EC).....	43
4.2 Nitrate:	44
4.3 Fluoride:	44
4.4 Suitability of ground water for drinking purpose	46
4.5 Suitability of ground water for irrigation	48
5. GROUND WATER RESOURCES	50
5.1 Ground Water Resources – Aquifer-I.....	50
5.2 Ground Water Resources – Aquifer-II.....	51
6. GROUND WATER RELATED ISSUES	54
6.1 Declining Water Levels	54
6.2 Low Rainfall, Vagaries of Monsoon and Droughts	55
6.3 Low Ground Water Storage Potential	57
6.4 Problems faced during drilling of Borewells:	57
6.5 Continuous Increase in Ground Water Extraction and Increase in Stage of Ground Water Extraction	58
7. MANAGEMENT PLAN	59
7.1 Supply Side Management	59
7.2 Demand Side Management	61

7.3	Expected Benefits	61
7.4	Development Plan	62
8.	SUM UP.....	66
9.	AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN.....	70
9.1	AKKALKOT TALUKA, SOLAPUR DISTRICT, MAHARASHTRA.....	70
9.2	BARSHI TALUKA, SOLAPUR DISTRICT, MAHARASHTRA	79
9.3	KARMALA TALUKA, SOLAPUR DISTRICT, MAHARASHTRA.....	90
9.4	MADHA TALUKA, SOLAPUR DISTRICT, MAHARASHTRA	99
9.5	MALSHIRAS TALUKA, SOLAPUR DISTRICT, MAHARASHTRA ...	107
9.6	MANGALVEDHE TALUKA, SOLAPUR DISTRICT, MAHARASHTRA 115	
9.7	MOHOL TALUKA, SOLAPUR DISTRICT, MAHARASHTRA	125
9.8	PANDHARPUR TALUKA, SOLAPUR DISTRICT, MAHARASHTRA	134
9.9	SANGOLE TALUKA, SOLAPUR DISTRICT, MAHARASHTRA	143
9.10	NORTH SOLAPUR TALUKA, SOLAPUR DISTRICT, MAHARASHTRA 153	
9.11	SOUTH SOLAPUR TALUKA, SOLAPUR DISTRICT, MAHARASHTRA 163	
10.	ANNEXURES	171

LIST OF FIGURES

Figure 1.1:	Index map of Solapur District	7
Figure 1.2:	Administrative map, Solapur District.....	8
Figure 1.3:	Locations of Existing Exploratory wells, Microlevel & Monitoring Wells.	9
Figure 1.4:	Geomorphology map	10
Figure 1.5:	Drainage map.....	11
Figure 1.6:	Soil map, Solapur District.....	12
Figure 1.7:	Land Use map.....	13
Figure 1.9:	Average Annual Rainfall.....	15
Figure 2.1:	Geological map of Solapur district.....	18
Figure 2.2:	Basaltic Flow	19
Figure 2.3:	Major aquifer, Solapur district.....	20
Figure 2.4:	Hydrogeology, Solapur district	23
Figure 2.5:	Aquifer I, Depth of occurrence and fractured rock thickness.....	24
Figure 2.6:	Aquifer II, Depth of occurrence and fractured rock thickness.....	25
Figure 2.7:	Yield potential Aquifer I	26
Figure 2.8:	Yield potential Aquifer II	27
Figure 2.9:	3D Aquifer Disposition	28
Figure 2.10:	Fence Aquifer Disposition	28
Figure 2.11:	Bar Diagram	29
Figure 2.12:	Hydrogeological section AA'	29
Figure 2.13:	Hydrogeological section BB'	29
Figure 3.1:	DTWL shallow aquifer (May 2017).....	32
Figure 3.2:	DTWL shallow aquifer (Nov 2017)	33
Figure 3.3:	Water level fluctuation (May 2017 vs Nov 2017)	34
Figure 3.4:	DTWL Deeper Aquifer (May. 2017).....	35
Figure 3.5:	DTWL Deeper Aquifer (Nov. 2017)	36
Figure 3.6:	Premonsoon decadal water level trend (May 2008-May 2017).....	37
Figure 3.7:	Postmonsoon decadal trend (2008-17)	38

Figure 3.8.1: Hydrograph (2010-19), Udagi, Akkalkot Taluka	39
Figure 3.8.2: Hydrograph (2010-19), Uplai Rly Stn, Barshi Taluka	39
Figure 3.8.3: Hydrograph (2010-19), Jeur, Karmala Taluka	40
Figure 3.8.4: Hydrograph (2010-19), Parite, Madha Taluka	40
Figure 3.8.5: Hydrograph (2007-17), Malshiras, Malshiras Taluka	40
Figure 3.8.6: Hydrograph (2010-19), Marwade, Mangalvedhe Taluka.....	41
Figure 3.8.7: Hydrograph (2010-19), Kurul, Mohol Taluka	41
Figure 3.8.8: Hydrograph (2010-19), Ranzani, Pandharpur Taluka	41
Figure 3.8.9: Hydrograph (2010-19), Junoni, Sangole Taluka.....	42
Figure 3.8.10: Hydrograph (2010-19), Nannaj, Solapur North Taluka.....	42
Figure 3.8.11: Hydrograph (2010-19), Nandni, Solapur South Taluka.....	42
Figure 4.1: Ground water quality, Aquifer-I.....	45
Figure 5.1: Ground Water Resources SOLAPUR district	51
Figure 6.1: Premonsoon water level trend	54
Figure 6.2: Postmonsoon water level trend	55
Figure 6.3.1: Rainfall Trend (1906-2019), Akkalkot taluka	56
Figure 6.3.2: Rainfall Trend (1901-2019), Barshi taluka	56
Figure 6.3.3: Rainfall Trend (1998-2019), Mangalvedhe taluka	56
Figure 6.3.4: Rainfall Trend (1998-2017), Mohol taluka.....	56
Figure 6.3.5: Rainfall Trend (1998-2017), South Solapur taluka.....	57
Figure 6.3.6: Rainfall Trend (1901-2019), North Solapur taluka.....	57
Figure 6.4: Changes in Ground Water Extraction and Increase in Stage of Ground Water Extraction in Solapur District	58
Figure 7.1: Proposed Artificial Recharge structures	60
Figure 7.2: Demand side intervention.	64
Figure 7.3: Additional area under Assured Ground Water irrigation.	65

LIST OF TABLES

Table 1.1: Long-term rainfall analysis	14
Table 1.2: Annual rainfall data (2010-2019) (in mm).....	15
Table 2.1: Generalized Geological sequence, Solapur district.....	17
Table 2.2: Aquifer wise characteristics	22
Table 4.1: Aquifer wise ranges of chemical constituents in Solapur district.....	43
Table 4.2: Aquifer wise Electrical conductivity data.....	44
Table 4.3: Aquifer wise nitrate and Fluoride concentration in Solapur district	44
Table 4.4: Concentration of Chemical constituents in shallow Aquifer	47
Table 4.5: Concentration of Chemical constituents in Deeper Aquifer.....	47
Table 4.6: Classification of Ground water for Irrigation based on EC values	48
Table 4.7: Classification of Ground water for Irrigation based on SAR values	49
Table 4.8: Classification of Ground water for Irrigation based on RSC values.	50
Table 5.1: Ground water resources, Aquifer-I (Shallow aquifer), Solapur district (2017)	50
Table 5.2: Taluka wise summarized Ground Water Resources of Aquifer-II (Deeper aquifer)52	
Table 7.1: Area feasible and volume available for Artificial Recharge	59
Table 7.2: Proposed Recharge Structures.....	60
Table 7.3: Area Proposed for Drip Irrigation Demand Side Management.....	61
Table 7.3: Expected benefits after management interventions	62
Table 7.4: Development plan.....	63

LIST OF ANNEXURES

- Annexure-I (A): Taluka-wise Salient Features of Ground Water Exploration
- Annexure-I (B): Salient Features of Ground Water Exploration and Water level Aquifer II.
- Annexure-II: Water Level of GWM wells (2017) with long term trend (2008-2017)
- Annexure-III: Details of GW monitoring wells and KOWs in Solapur district.
- Annexure-IV: Chemical analysis of ground water samples, Shallow aquifers
- Annexure-V: Chemical analysis of ground water samples, Deeper aquifers
- Annexure-VI (A): Location (tentative) of proposed Artificial Recharge structures
(Percolation tanks)
- Annexure-VI (B): Location (tentative) of proposed Artificial Recharge structures
(Check Dams)

AQUIFER MAPS AND GROUND WATER MANAGEMENT PLANS SOLAPUR DISTRICT, MAHARASHTRA

1. INTRODUCTION

National Aquifer Mapping (NAQUIM) has been taken up in XII five-year plans by CGWB to carry out detailed hydrogeological investigation on toposheet scale of 1:50,000. The NAQUIM has been prioritized to study Over-exploited, Critical and Semi-Critical Talukas as well as the other stress areas recommended by the State Govt. Aquifer mapping is a process wherein a combination of geological, geophysical, hydrological and chemical analyses is applied to characterize the quantity, quality and sustainability of ground water in aquifers.

The vagaries of rainfall, inherent heterogeneity & unsustainable nature of basalt aquifers, over exploitation of once copious alluvial aquifers, lack of regulation mechanism has a detrimental effect on ground water scenario of the Country in last decade or so. Thus, prompting the paradigm shift from “traditional groundwater development concept” to “modern groundwater management concept”.

Varied and diverse hydrogeological settings demand precise and comprehensive mapping of aquifers down to the optimum possible depth at appropriate scale to arrive at the robust and implementable ground water management plans. The proposed management plans will provide the “Road Map” for ensuring sustainable management and equitable distribution of ground water resources, thereby primarily improving drinking water security and irrigation coverage. Thus, the crux of NAQUIM is not merely mapping, but reaching the goal-that of ground water management through community participation. The aquifer maps and management plans will be shared with the Administration of Solapur district, Maharashtra for its effective implementation.

The activities under NAQUIM are aimed at:

- ❖ Identifying the aquifer geometry,
- ❖ Aquifer characteristics and their yield potential
- ❖ Quality of water occurring at various depths,
- ❖ Aquifer wise assessment of ground water resources
- ❖ Preparation of aquifer maps and
- ❖ Formulate ground water management plan

1.1 About the Area

Solapur district is one of the five districts of Pune division of Maharashtra State that form the region of Western Maharashtra. It is situated in the southeastern edge of the State and lies between 17°21'N 75°10'E / 17.35°N 75.16°E - 18°19'N 76°09'E / 18.32°N 76.15°E. The total area of the district is 14895 sq. km. and falls in parts of Survey of India degree sheets 47D, 47J, 47K 47N, & 56C. It has an average elevation of 458 metres. It is the fourth largest district in Maharashtra in terms of land area and seventh largest in terms of population. The district has the largest industry in Maharashtra for Beedi production. Solapur is situated on Deccan plateau.

The district is bounded on the north east by Osmanabad district, on the south east by Karnataka state, on the south west by Sangli district, on the west by Satara district on the northwest by Pune and Ahmednagar districts.

The district headquarters is located in Solapur Town. For administrative convenience, the district is divided into 11 talukas viz., Solapur North, Malshiras, Pandharpur, Barshi, Madha, Sangole, Akkalkot, Mohol, Solapur South, Karmala and Mangalvedhe. It has a total population of 4,317,756 as per 2011 census. The district has 11 talukas, 11 towns and 1146 villages. A major part of the district comes under Bhima and Sina catchment of Krishna basin.

Since 1980, Central Ground Water Board has taken up several studies in the district. Keeping in view the current demand and supply and futuristic requirement of water, Central Ground Water Board has initiated the National Aquifer Mapping Programme (NAQUIM) in country during XII five-year plan, with a priority to study Over-exploited, Critical and Semi-Critical talukas. Hence, Solapur district has been taken up to carry out detailed hydrogeological investigations in the year 2016-17, 2016-17 and 2019-20. Only three talukas of Solapur district, namely, South Solapur, North Solapur and Akkalkot talukas are categorised as “safe”; Barshi, Karmala, Madha, Mangalwedhe, Mohol, Pandharpur and Sangole talukas are categorised as “semi-critical”; and Malshiras taluka is categorised as “over-exploited” as per Ground Water Resources Estimation as on March 2017. The Index map and Administrative of the study area is presented in Figures 1.1 & 1.2.

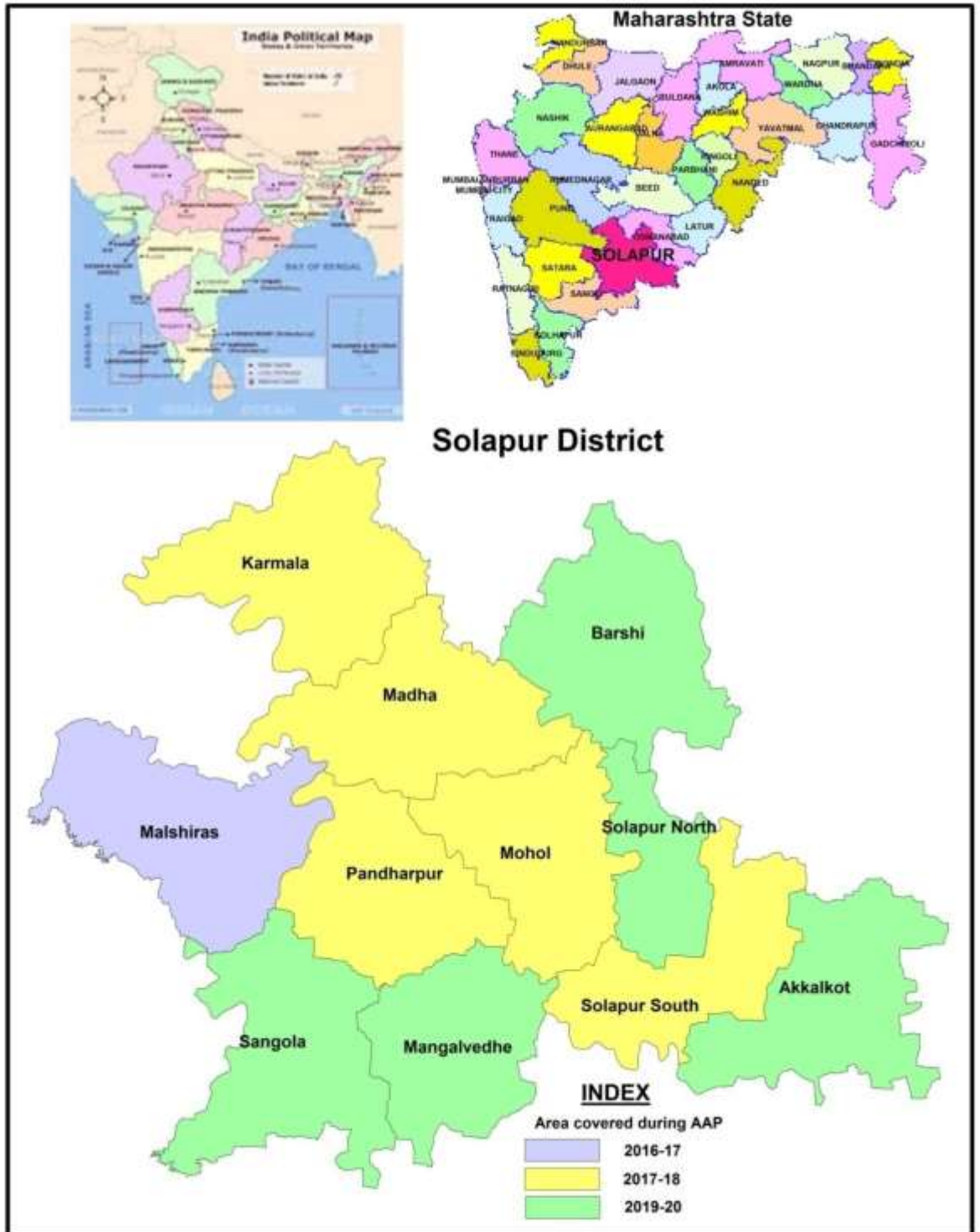


Figure 1.1: Index map of Solapur District

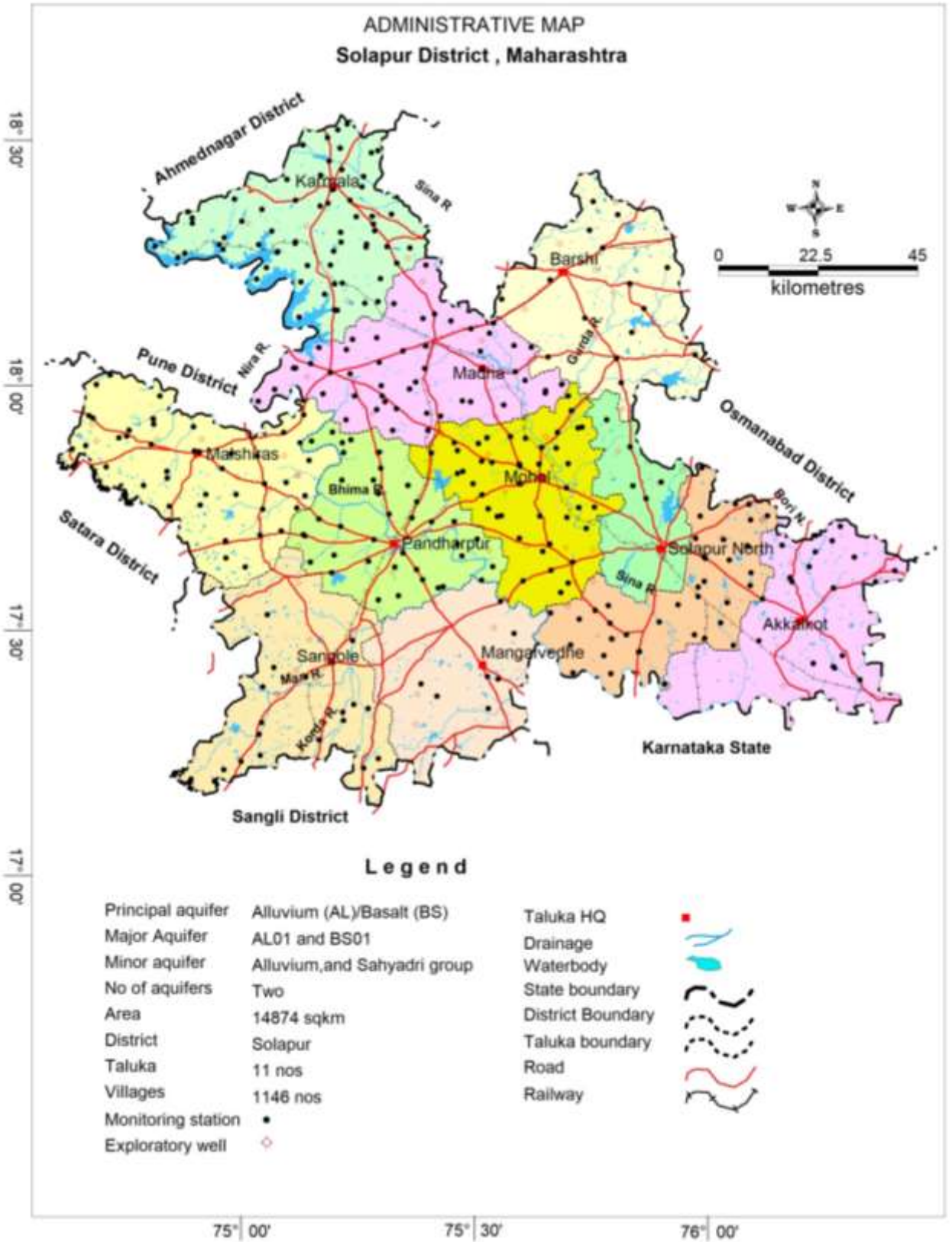


Figure 1.2: Administrative map, Solapur District

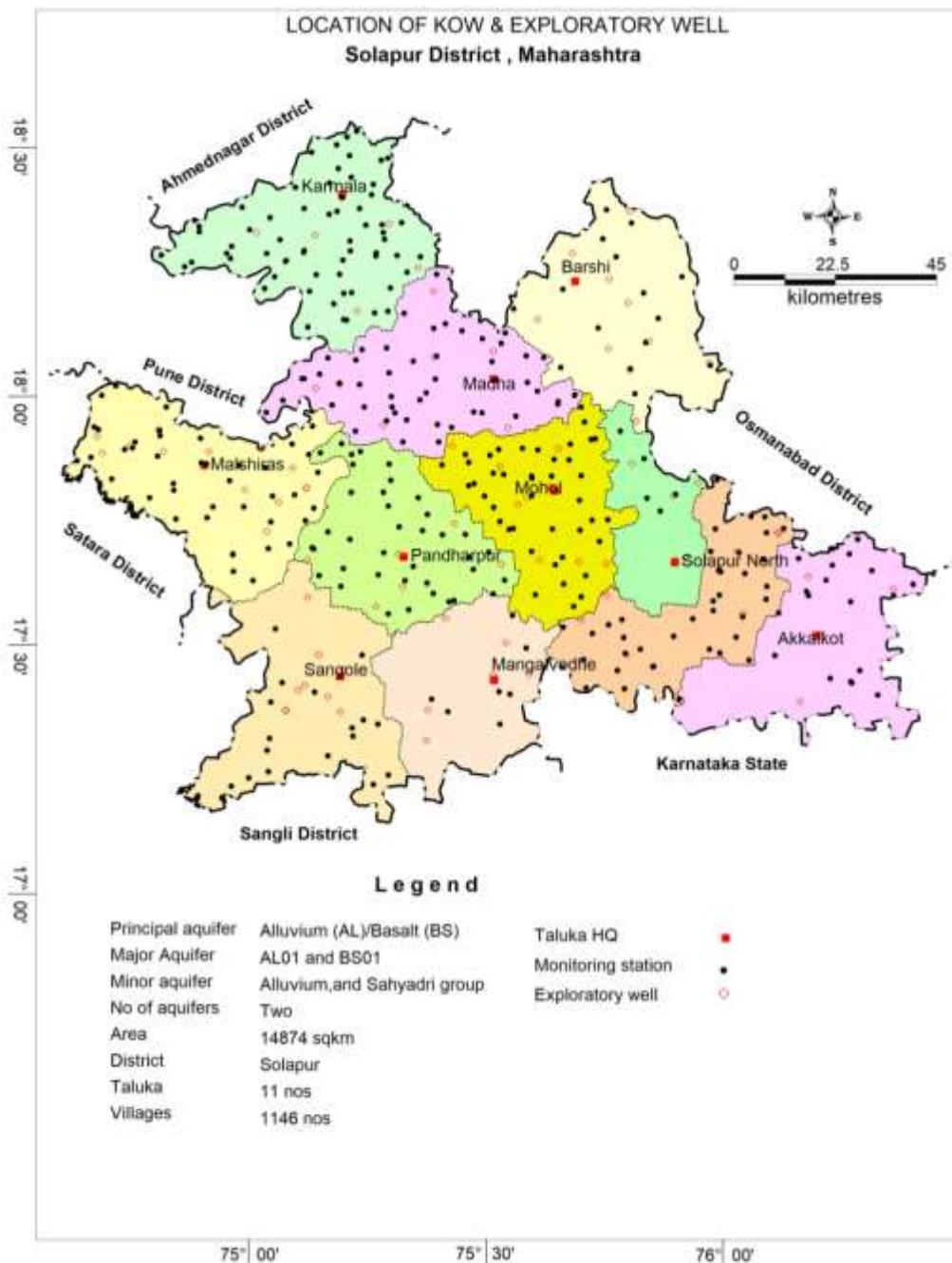


Figure 1.3: Locations of Existing Exploratory wells, Microlevel & Monitoring Wells.

Ground water exploratory drilling in the district has been taken up in different phases since 1957. The ground water exploration has been done in hard rock areas occupied by Deccan Trap Basalt. To establish the aquifer geometry, disposition and potential of aquifers, ground water exploration down to the depth of 200 m bgl has been taken up where the data gap exists and accordingly 12 exploratory wells and 2 observation wells have been constructed during 2017-18. A total of 88 EW, 9 OW and 1 Piezometer have been constructed till March 2018. Location of exploratory wells is presented in Figure 1.3 & Salient Features of Ground Water Exploration are given in Annexure –I (A) and I (B)

1.2 Geomorphology, Drainage, Land Use and Soil Types

The district forms a part of the vast Maharashtra plateau with the lofty Sahyadri ranges on the west. The average ground elevation is between 450 to 600 metres above mean sea level and shows gentle slope towards south and south east. The highest elevation in the district is 720 m. amsl., observed on the NW-SE trending hill ranges near Jalbhari and the lowest elevation is 420 mamsl, observed near Dharang on Bhima riverbed. In general, the district exhibits undulating topography, consisting of low-lying plateaux with isolated hillocks. Geomorphological map is given in **Figure 1.4.**

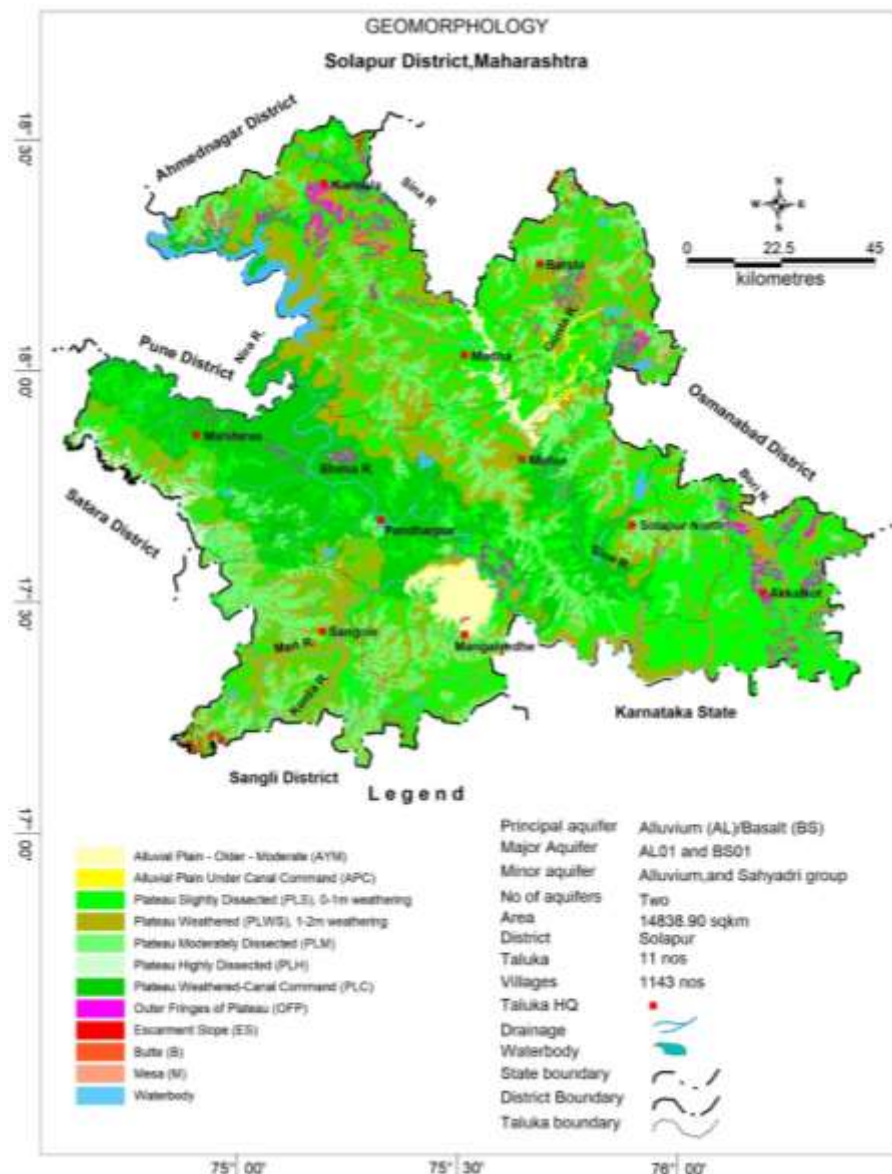


Figure 1.4: Geomorphology map

The district comes under Bhima sub-basin of Krishna basin and has flat to undulating topography. The district is typically characterized by the morphology of Deccan basaltic flows. The elevation in the district is ranges from 420 to 720 m amsl.

The Bhima is the main river of the District. The Nira and the Man are its chief right bank tributaries while the Sina is its main left bank tributary. The Bhima and Sina flow in a general south-easterly direction while the Nira runs east and the Man north-easterly. The major Rivers flowing in the district are the Bhima, Sina and Man. The Bhima river originates near Bhimashankar hills on Western Ghats, known as Sahyadri in Pune District and enters Solapur district near village Jinti in Karmala Taluka. Dendritic drainage has been observed only in the vicinity of major Rivers where alluvial deposits or thick soil cover is present. However, all the streams and Rivers which flow in the district is effluent in nature. All the rivers mostly have semi-dendritic drainage pattern, and the drainage density is quite high. These rivers are flooded in the rainy season and are dry in the summer season. Based on geomorphological setting and drainage pattern the district is divided into 16 watersheds. Drainage map of the Solapur district is presented in **Figure 1.5**.

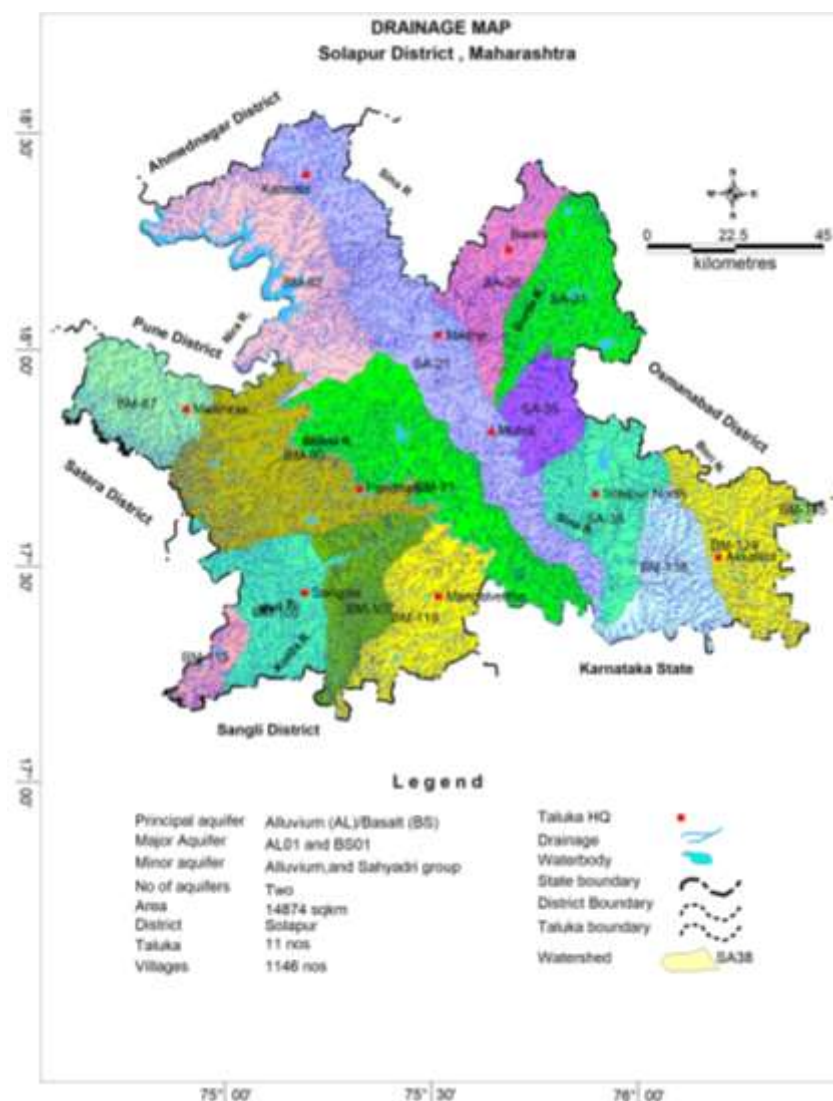


Figure 1.5: Drainage map

The soil of the Solapur district (**Figure 1.6**) is mainly derived from Deccan basalts. The soil of the district is underlain by partially decomposed basaltic rock locally known as “Murum” which overlies parent rock. The soils of the District can be broadly grouped into three kinds on the basis of colour i.e. black soils, grey soils and

reddish soils. except Karmala, the soil in the district is grey to black while in Karmala taluka half the soil is black, and the remaining is red or coarse grey. The black soil here is not very deep except along the valleys. The soils exhibit varying degrees of erosion and truncated profile is a common occurrence. The soils can be broadly classified in the four main categories on the basis of depth and structure.

- ❖ Very shallow soil with depth less than 7.5 cm.
- ❖ Shallow soils between 7.5-to 22.5cm depths.
- ❖ Medium deep soils between 22.5 and 90 cm depths.
- ❖ Deep soils with depth more than 90 cm.

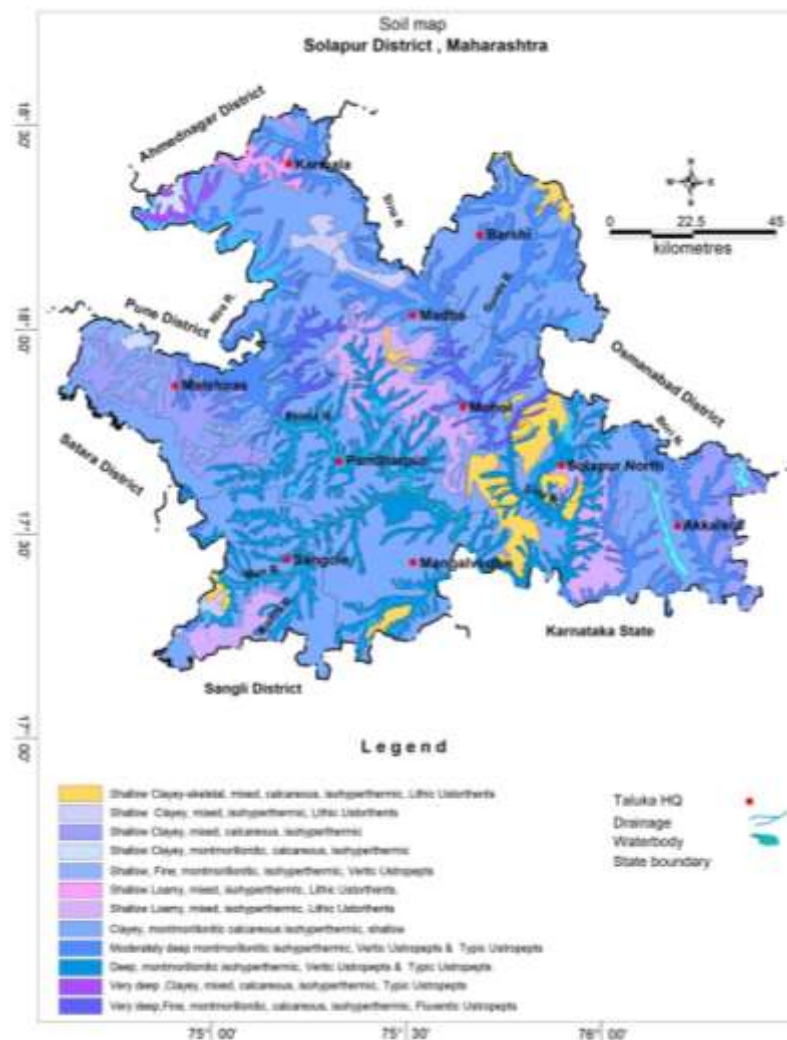


Figure 1.6: Soil map, Solapur District

Land Use (Figure 1.7) details have been observed that the major parts of the district are covered by agricultural land with net sown area of 10064.75 Sq.km (67.6%). Forest covers very little area of 342.00 Sq.km (2.3 %) and double cropped area covers 421.21 Sq.km (2.8%). The built-up area is reflected wherever settlements have come up.

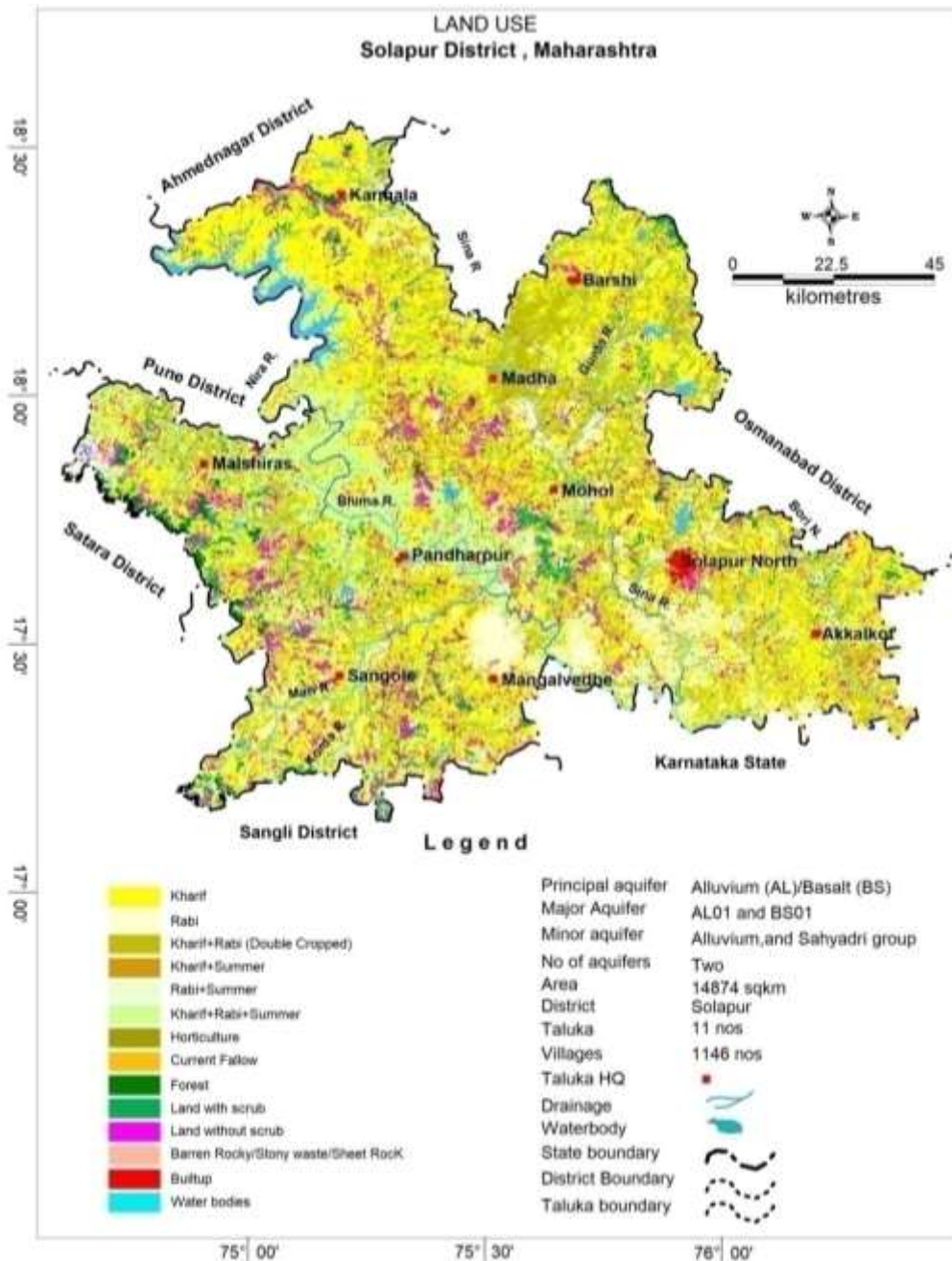


Figure 1.7: Land Use map

1.3 Climate and Rainfall

Climate of the District is characterised by general dryness except during the monsoon season. The cold season, from December to about the middle of February is followed by the hot season, which lasts up to the end of May. May is the hottest month of the year. The maximum temperature may usually go up to 34°C or 45°C. June to September is the south-west monsoon season while October and November constitute the post monsoon season. The District falls under rain shadow zone of the State. The south-eastern parts of the District get slightly more rainfall than the rest of the District. The average annual rainfall (2008-2017) of the District is 488.8 mm (Figure 1.8). Most of the rainfall is received during the south-west monsoon in the months from June to September and constitute about 74 percent of the normal

annual rainfall. About 17 per cent of the rainfall in District is received in the post monsoon season. The variation in the annual rainfall from year to year is large. Isohyet of the district for the normal rain fall is given in **Figure 1.9**.

Long term rainfall analysis (1901-2019 or as per data availability) and annual rainfall data of last ten years is given in **Table 1.1 and 1.2**.

Table 1.1: Long-term rainfall analysis

Taluka	Period	No of Years	Normal Rainfall	Std. Deviation	Coefficient of Variation	Rainfall Trend/Slope (mm/year)	Departures - Number of Years (% of Total Years)						
							Positive	Negative	Droughts			Normal & Excess R/F	
									Moderate	Severe	Acute	Normal	Excess
Akkalkot	1906 - 2019	109	766.8 mm	226 mm	33%	-1.34 mm/year	51 (47%)	58 (53%)	31 (28%)	6 (6%)	0 (0%)	60 (55%)	12 (11%)
Barsi	1901 - 2019	117	679.2 mm	193 mm	29%	0.694 mm/year	59 (50%)	50 (49%)	22 (19%)	6 (5%)	0 (0%)	72 (62%)	17 (14%)
Karmala	1901 - 2017	111	577.5 mm	212 mm	37%	0.552 mm/year	56 (50%)	55 (50%)	18 (16%)	10 (9%)	0 (0%)	59 (53%)	24 (22%)
Madha	1901 - 2017	111	497.2 mm	194 mm	32%	.346 mm/year	50 (48%)	54 (52%)	21 (20%)	1 (1%)	1 (1%)	61 (59%)	20 (19%)
Malshiras	1901 - 2017	113	530 mm	225 mm	42%	.738 mm/year	54 (48%)	59 (52%)	24 (21%)	6 (5%)	1 (1%)	61 (54%)	21 (19%)
Mangal vedhe	1998 - 2019	22	596.2 mm	198 mm	36%	-17.26 mm/year	11 (50%)	11 (50%)	5 (23%)	2 (9%)	0 (0%)	12 (55%)	3 (14%)
Mohol	1998 - 2017	20	575 mm	243 mm	42%	-17.944 mm/year	10 (50%)	10 (50%)	2 (10%)	2 (10%)	0 (0%)	34 (70%)	2 (10%)
Pandharpur	1901 - 2017	115	610.4 mm	204 mm	33%	-231 mm/year	52 (45%)	63 (55%)	22 (19%)	4 (3%)	0 (0%)	66 (58%)	23 (20%)
Sangole	1901 - 2019	117	537.3 mm	210 mm	37%	0.694 mm/year	52 (47%)	59 (53%)	22 (20%)	1 (1%)	0 (0%)	61 (55%)	27 (24%)
N.Solapur	1901 - 2019	117	699.1 mm	216 mm	31%	0.443 mm/year	53 (45%)	66 (55%)	23 (19%)	5 (4%)	0 (0%)	71 (60%)	20 (17%)
S.Solapur	1998 - 2017	20	599.2 mm	200 mm	33%	-15.49 mm/year	9 (45%)	11 (55%)	00 (0%)	2 (10%)	0 (0%)	16 (80%)	2 (10%)

NOTE: Rainfall departure: EXCESS: > +25; NORMAL: +25 TO -25; MODERATE: -25 TO -50; SEVERE: -50 TO -75; ACUTE: < -74

Based on long term rainfall analysis it is observed that:

- The normal annual rainfall in the district varies between 497 mm in Madha taluka and 766.8 mm in Akkalkot taluka. **Table 1.1**
- The coefficient of variation of the annual rainfall from the normal rainfall has been observed between 29 and 42.
- The percentage of probability of receiving excess rainfall varies from 10 % at S. Solapur and Pandharpur talukas to 24 % at Sangole taluka.

Table 1.2: Annual rainfall data (2010-2019) (in mm)

Taluka	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average
Akkalkot	700.1	626	560.3	622.8	551.9	350	460.7	387.9	465.1	598.5	532.3
Barshi	1067	536.7	551.8	543.2	496.7	309.6	601.4	784.3	360.6	589	584.0
Karmala	980.9	535.5	272.6	506.8	446.8	333.9	425.3	568.3	171.3	475.2	471.7
Madha	1200.3	413.7	444.5	602.4	454.3	361.7	542.8	617.8	191.9	509.4	533.9
Malshiras	741.3	436.8	315.3	597	396.6	277.3	449.1	530.9	209.5	581.1	453.5
Mangalwedha	659.4	332.3	405.8	444	424.7	277.6	324.6	459.1	182.4	560.5	407.0
Mohol	1031.3	519.9	318.6	531.8	436.8	280.8	325.1	526.3	238.6	552.7	476.2
N.solapur	781.3	633.5	479.7	545.1	549.2	332.5	582.7	426.7	257.5	628.8	521.7
Pandharpur	767	413.3	364	577.9	439.6	348.7	377.6	515.8	235.4	415.6	445.5
S.solapur	781.3	633.5	472.9	510.6	467.3	266.8	548.6	473.7	273.7	645.8	507.4
Sangola	591.9	342.2	401.4	457.3	542.7	334.4	480.7	570.9	241.6	468.4	443.2
District Average	845.6	493.0	417.0	539.9	473.3	315.8	465.3	532.9	257.1	547.7	488.8

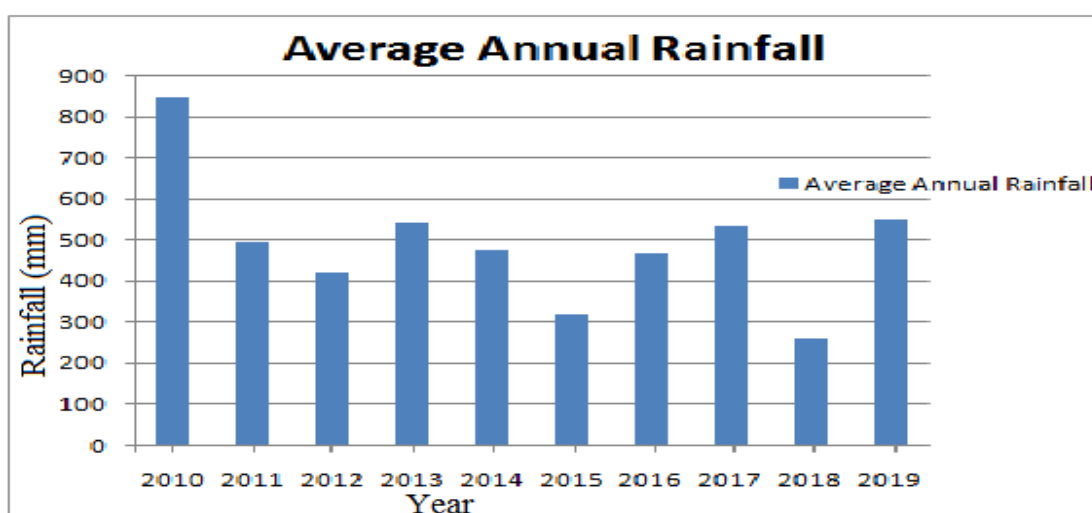


Figure 1.9: Average Annual Rainfall

The annual rainfall data of last ten years (**Table 1.2 and Figure 1.9**) indicates that Solapur district faces vagaries (uncertainty) of rainfall and the district experiences low and declining rainfall trend. The average yearly rainfall in Solapur district during 2010 was 845.6 mm and in the year 2018 it was only 257.1 mm. The spatial distribution (variation) of ten years average annual rainfall varies from 584.0 mm in Barshi Taluka to 407.0 mm in Mangalwedha Taluka.

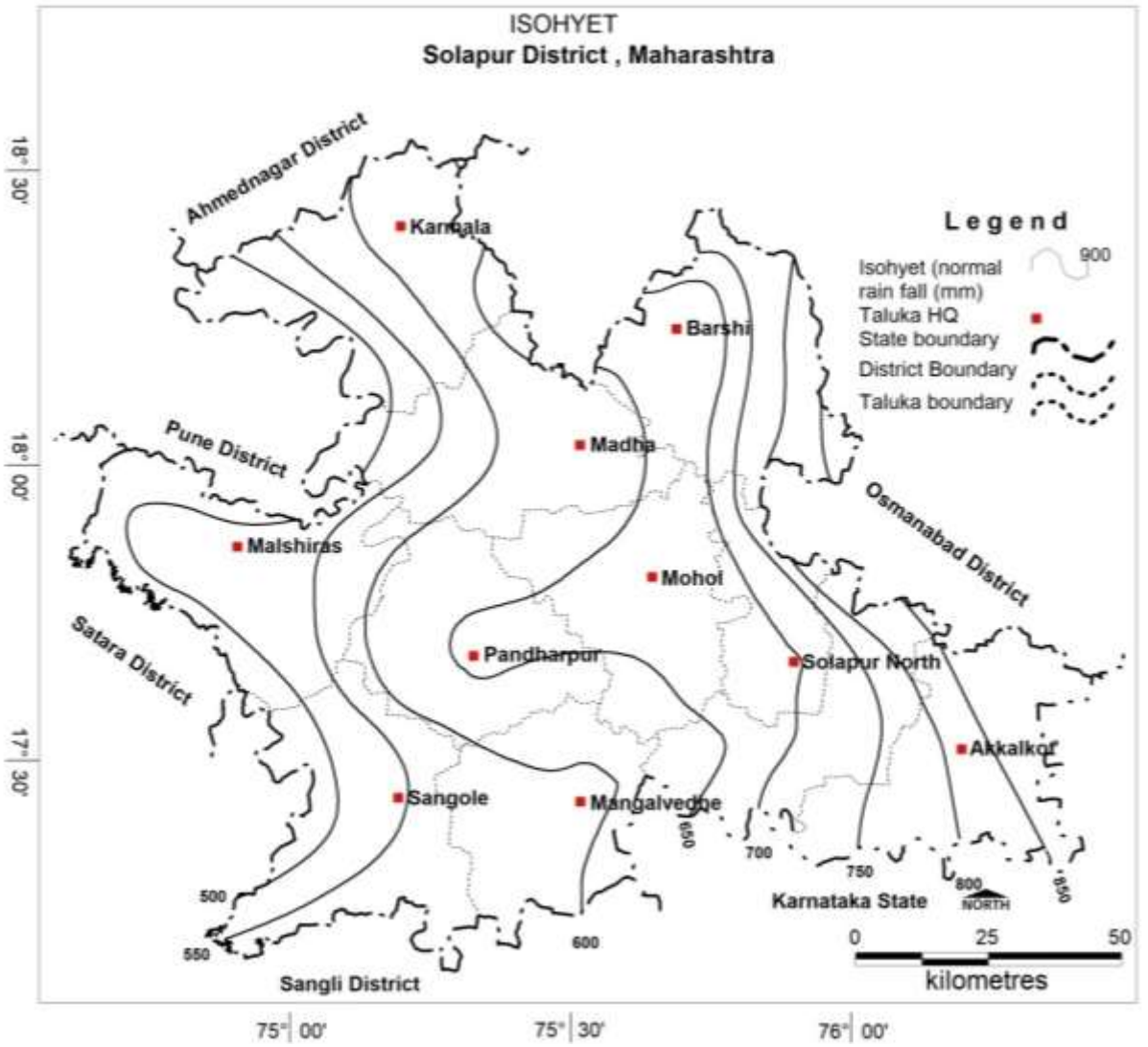


Figure 1.10: Isohyet (Normal rainfall) .

2. GEOLOGY AND HYDROGEOLOGY

2.1 Geology

Geologically, Solapur district is divided into two parts i.e., Alluvium and Deccan Trap Basalt formations (**Figure 2.1**). The generalized geological sequence occurring in the district is given in **Table 2.1**.

Table 2.1: Generalized Geological sequence, Solapur district

Age	Group	Sub-groups	Formation	Thickness in meters	Lithology
Quaternary (Recent to Sub-Recent) (> 1 million years)			Alluvium		Sand, silt and clay.
Upper Cretaceous to Eocene (30-60 million years)	North Sahyadri		Mahabaeshwar	32-100	Deccan Trap basalt with inter- trappeans : Simple flows, aphyric to plagioclase microphyric
		Diveghat	Purandargad	45-90	Deccan Trap basalt with inter- trappeans : Simple flows, aphyric to plagioclase microphyric
			Diveghat	>190	Deccan Trap basalt with inter- trappeans : Simple/ Aa flows, aphyric
		Lonavala	Karla	15-25	Deccan Trap basalt with inter- trappeans : Fine grained, aphyric, pahoehoe flows
			Indrayani	25-45	Deccan Trap basalt with inter- trappeans. :a thick succession of 'Aa' flows - Aphyric to sparsely phytic flows

Alluvium, belonging to the Quaternary period comprises sand, silt and clay deposits, restricted as narrow belts along the banks of major river courses like Sina and their tributaries and in a patch in Mangalvedhe taluka. Major part of the District underlain by Deccan Volcanic Basalts belonging to Sahyadri Group of Upper Cretaceous to Lr Eocene age, comprises of various lava flows, which can be classified into two types as simple and compound flows. The compound flows occur at lower elevations whereas the simple flows are confined to the elevation above 680 m. The compound flows although vesicular and amygdaloidal in nature, hard and compact in their middle part. They are fractured and jointed and show moderate degree of weathering at places. Each individual lava flow consists of lower massive part

becoming vesicular /amygdaloidal towards top, ranges in their individual thickness from a few centimetres to tens of meters. The flows have wide variation in colour and texture especially when they are amygdaloidal in nature with secondary mineral infillings such as Zeolites, calcite, and Agate and Chalcedony etc. The red /green/black bole beds constituting the marker horizons separating the two flows were discontinuous and generally inconsistent. The basalts are intruded by dykes and are found commonly in pahoehoe flows in the area. There are 13 basaltic flows between the elevations of 420 m to 720 m amsl (**Figure 2.2**).

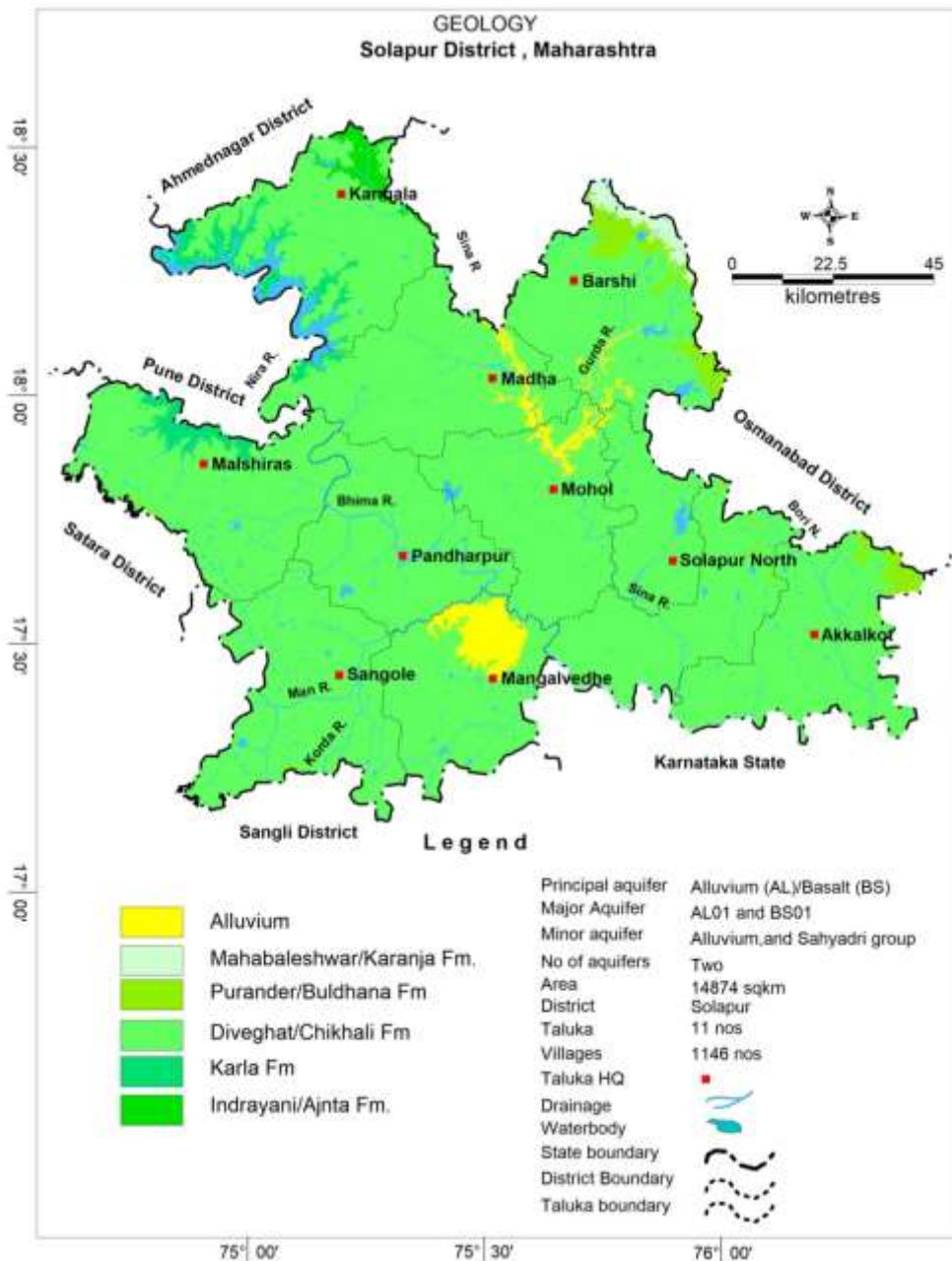


Figure 2.1: Geological map of Solapur district

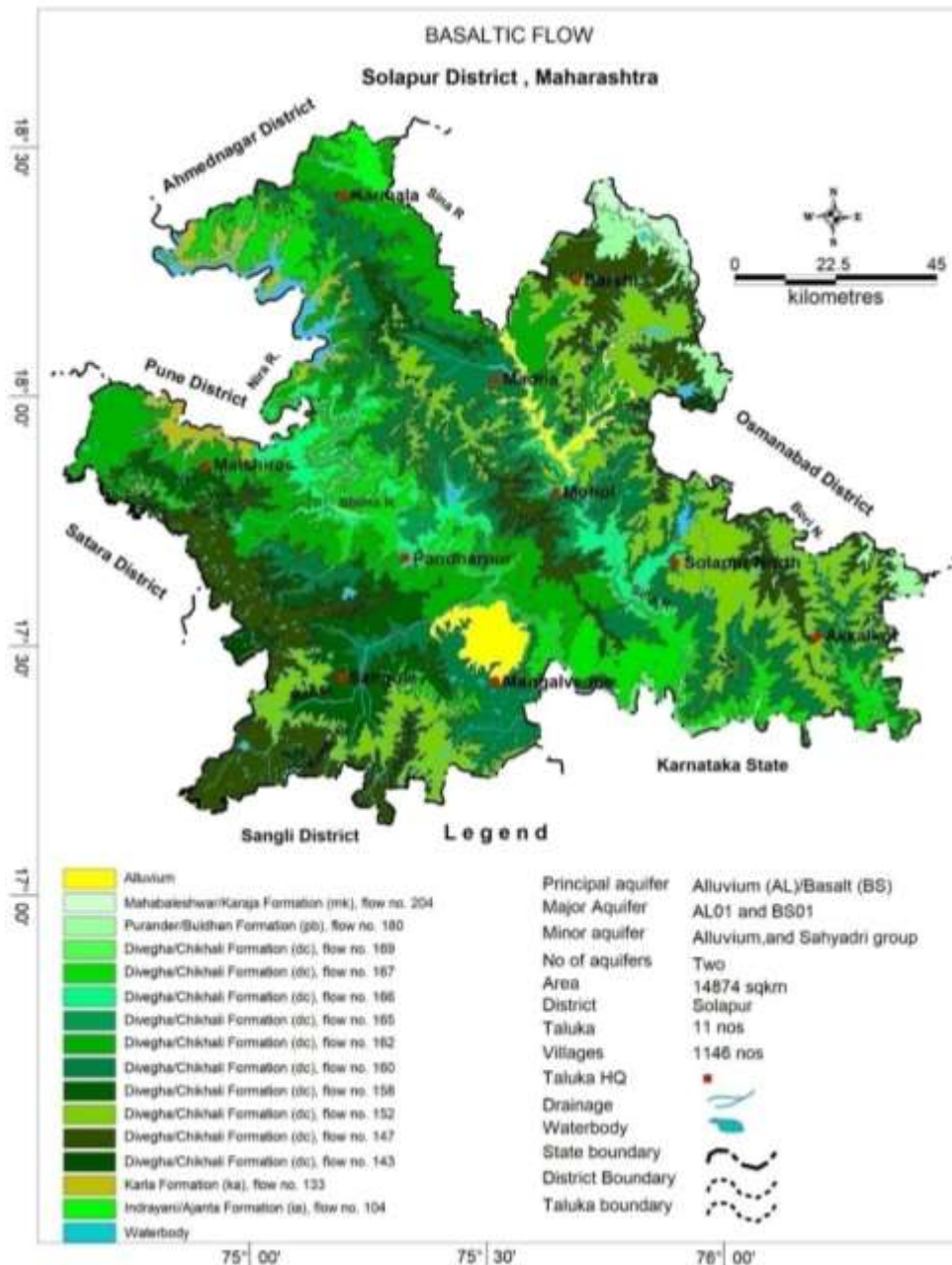


Figure 2.2: Basaltic Flow

2.2 Hydrogeology

2.2.1 Major Aquifer Systems

Alluvium and Basalt aquifers are the main aquifers in the district. Two aquifer Systems in Basalt and one in Alluvium are found to be prevailing in the district. (Figure 2.3)

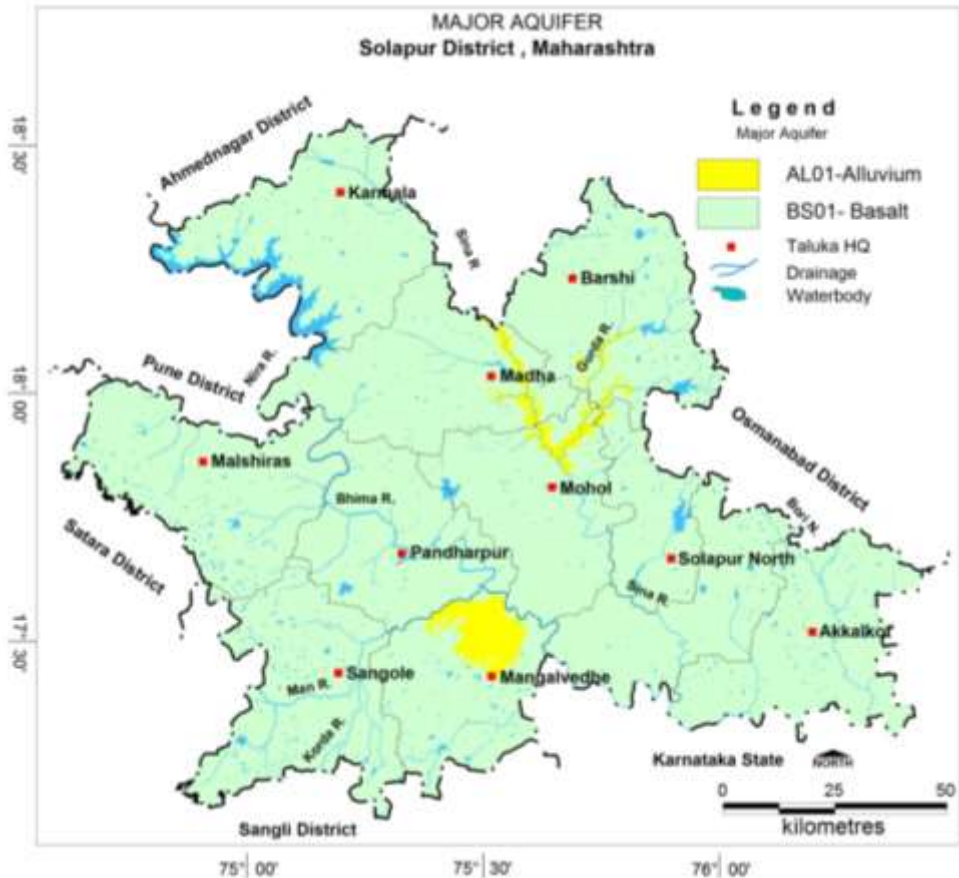


Figure 2.3: Major aquifer, Solapur district

The entire district is underlain by Deccan trap basalt except the banks of the Bhima River, its tributaries and north of Mangalwedha taluka. A map depicting hydrogeological features is presented in **Figure 2.4**.

Alluvium:

Alluvium, belonging to the Quaternary period forms a very productive aquifer in the district. The alluvial deposits are restricted as narrow belts along the banks of major river courses like Sina and their tributaries and in Mangalwedha taluka. The alluvium occurs in patches in paleo depressions. These shallow alluvium deposits comprise of upper layer of silty material underlain by a layer of coarse material like sand, gravel with admixture of clayey material. The coarser material is found in lenses and form good water bearing horizon while finer material like clay and silty material do not permit movement of ground water. The thickness of alluvial deposits varies from few meters to 20 to 60 mbgl in the Solapur district. The semi-consolidated alluvial sediments rest over the massive, weathered or amygdaloidal zones of the basaltic lava flows.

Deccan trap basalt

Major part of the District underlain by Deccan Volcanic Basalts belonging to Sahyadri Group of Upper Cretaceous to Lr Eocene age, comprises of various lava flows, which although vesicular and amygdaloidal in nature, hard and compact in their middle part. They are fractured and jointed and show moderate degree of weathering at places. Each individual lava flow consists of lower massive part becoming vesicular /amygdaloidal towards top, ranges in their individual thickness

from a few centimetres to tens of meters. The red /green/black bole beds constituting the marker horizons separating the two flows were discontinuous and generally inconsistent.

Hydrogeologically, Deccan Trap basalts are inhomogeneous rock formations. The ground water occurrence and movement are restricted to only weathered/vesicular and jointed /fractured parts of the rock formations. The basalt consists of multiple aquifers and exhibits a wide variation in the joint/fracture intensity. The yield of the wells depends upon the permeability and transmissivity of the aquifer, which in turn depends upon the presence of the interconnected pore space (either primary or secondary or both) available for storage of water. The ground water potential areas are generally localized in basalt due to wide variation in secondary porosity. The basalts are intruded by dykes and are found commonly in pahoehoe flows in the area. The dykes vary in thickness from one or two meters to as much as 10 meters and extend for long distances. The dykes display the joints parallel to the walls, at right angle to the walls besides horizontal ones, with chilled margins. The dykes act as barrier or as water conduits / pathways for the movement of groundwater flow depending on intensity of fracturing in the dyke rock. The location and orientation of the dykes with respect to the groundwater flow are very important. Generally, ground water occurs under phreatic/unconfined to semi-confined conditions. Shallow Aquifer is generally tapped by dug wells of 10 to 30 m depth with water levels ranging from 4.1 to 23.5 m bgl and yield varies from 10-100 m³/day. The deeper Aquifer is being tapped by borewells with depth ranging from 40 to 205 mbgl and the water level from 9 to 55 mbgl. Based on Ground Water Exploration data, aquifer-wise characteristics are given in table 2.2. Maps depicting depth of occurrence, fractured/granular rock thickness and aquifer-wise yield potential maps are shown in **Figure 2.5, Figure 2.6, Figure 2.7 and Figure 2.8.**

The oldest Lower, Indrayani Formation is characterized by the presence of compact, massive, porphyritic basalt. The phenocrysts are embedded in fine-grained groundmass. This formation is classified as Khandala Formation of Lonavala subgroup based on geochemical consideration. Indrayani Formation lava flows are, generally jointed and highly weathered, occupy the low-lying flat plain of Bhima and Sina rivers and give rise to moderate to good aquifers.

Karla Formation essentially comprises of compound lava flows exhibiting the pahoehoe characters. Based on geochemical characters this formation has been classified as Bushe Formation. It is comprised of aphyric or sparsely plagioclase phytic compound flows. The flows are characterized by the presence coarse grained, altered, amygdaloidal basalt and near absence of plagioclase. From the ground water point of view this formation occupies the low-lying fiat plains and gives rise to moderate to good aquifers.

Diveghat Formation, overlying the Karla Formation is exposed on the hills and along the hill slopes 550 m above msl. It comprises mainly of simple flows of 'aa' type that are aphyric. The lava flows of this formation are characterized by presence of vesicular, plagioclase basalt with medium-grained groundmass. From hydrogeological view point these flows occur on the hilly terrain and therefore not potential for groundwater.

Purandargad is the youngest formation characterized by the presence of aphyric to plagioclase microphyric basalt with the phenocrysts embedded in a fine-grained groundmass. From hydrogeological point of view this formation is not very significant as it occupies the hills and hill slopes. This formation is not potential for the development of groundwater resources as it forms the runoff zone.

Mahabaleshwar formation comprises 4-6 aa flows with exposed thickness varying from 32 to 100 metre and is mainly exposed in the southern and northeastern part of the district. The unclassified basaltic flows composed mostly aa flows with some compound flows, the general gradient of the flows is around 1:550 to 1:800 towards SE.

The water table varies from 420 m amsl in southeastern part of the area to about 560 m amsl in northwestern part of Solapur district. Ground water flow direction is controlled by basin divide of Krishna (Sina/Bhima sub basin) river basin. In general, the ground water movement is towards the Bhima, Sina, Gorda and Nira rivers. It has been observed that the ground water flow direction follows the topography of the area and is towards the major drainage.

Table 2.2: Aquifer wise characteristics

Type of Aquifer	Formation	Depth range (mbgl)	SWL (mbgl)	Fracture/ weathered Zones encountered (mbgl)	Fractured/ weathered rocks Thickness (m)	Yield (m ³ /day)	Sustai- nability	Aquifer parameter (Transmi ssivity – m ² /day)	Sy/S	Suitability for drinking/ irrigation
Aquifer-I	Alluvium	20-60	4.1 – 23.5	Upto 60	15 to 30	60 to 200 m ³ /day	1 to 5 Hours	1.25-207	0.06-0.1	Yes, suitable for both
	Deccan Trap- Weathered/ Fractured Basalt	8.9-30	4.1 – 23.5	Upto 30	5 to 15	10 to 100 m ³ /day	1 to 3 Hours	30 -80	0.019-0.028	Yes, suitable for both
Aquifer-II	Jointed/ Fractured Basalt	30 to 196	9.0-55	Upto 196	0.5 to 12	Upto 3.0 lps	0.5 to 3 hours	25 - 210	3x10 ⁻⁶ and 1.7x10 ⁻³	Yes, suitable for both, except High EC

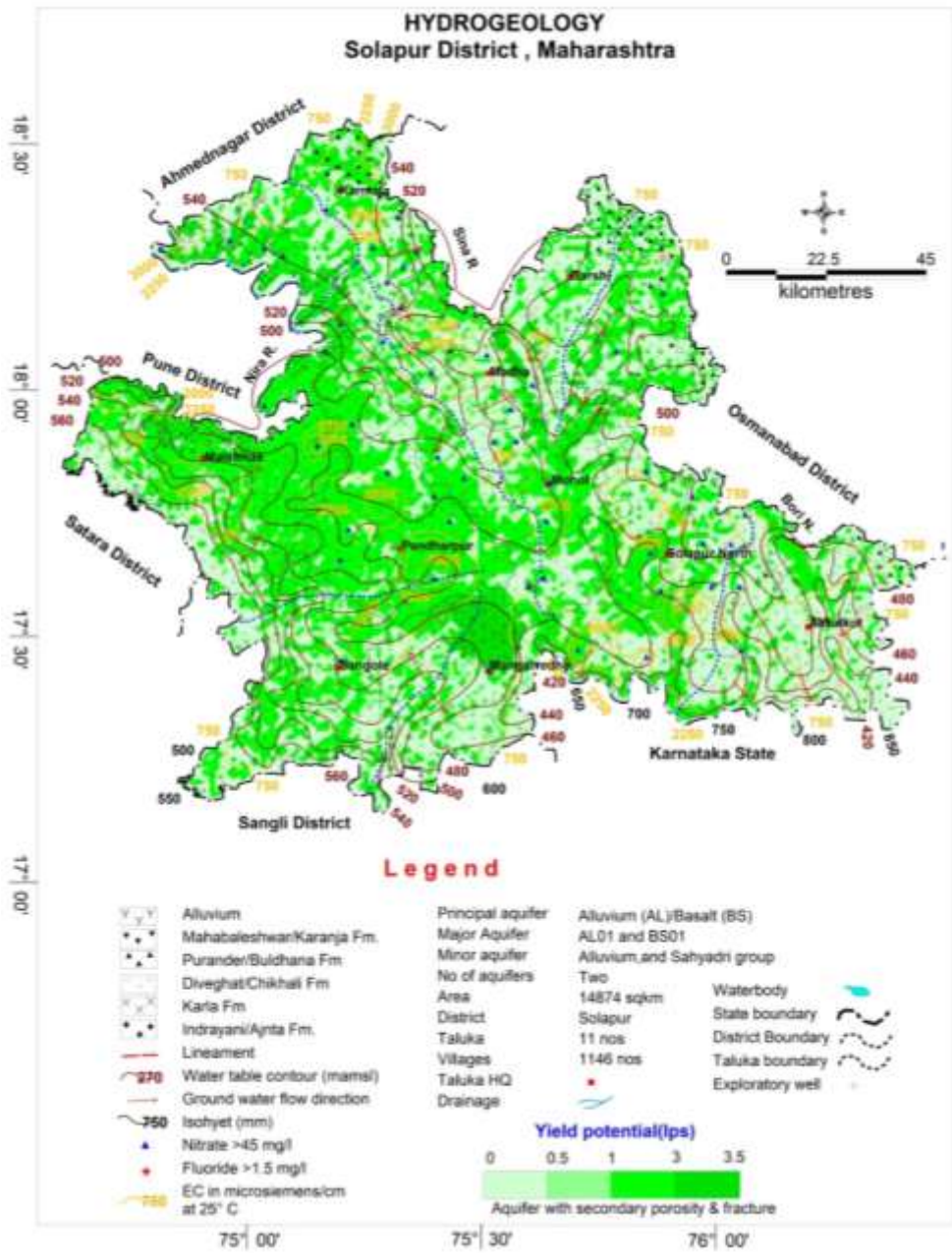


Figure 2.4: Hydrogeology, Solapur district

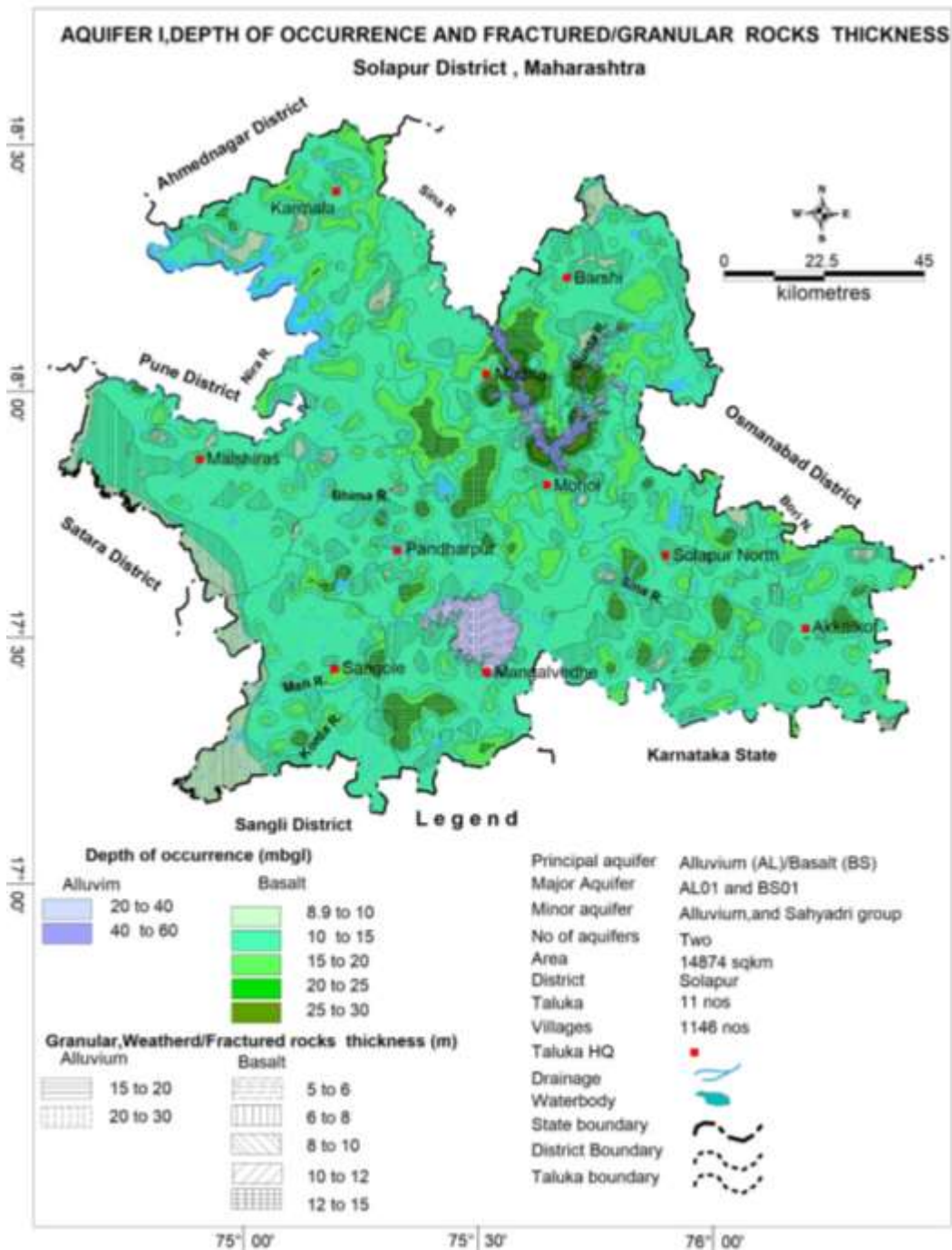


Figure 2.5: Aquifer I, Depth of occurrence and fractured rock thickness

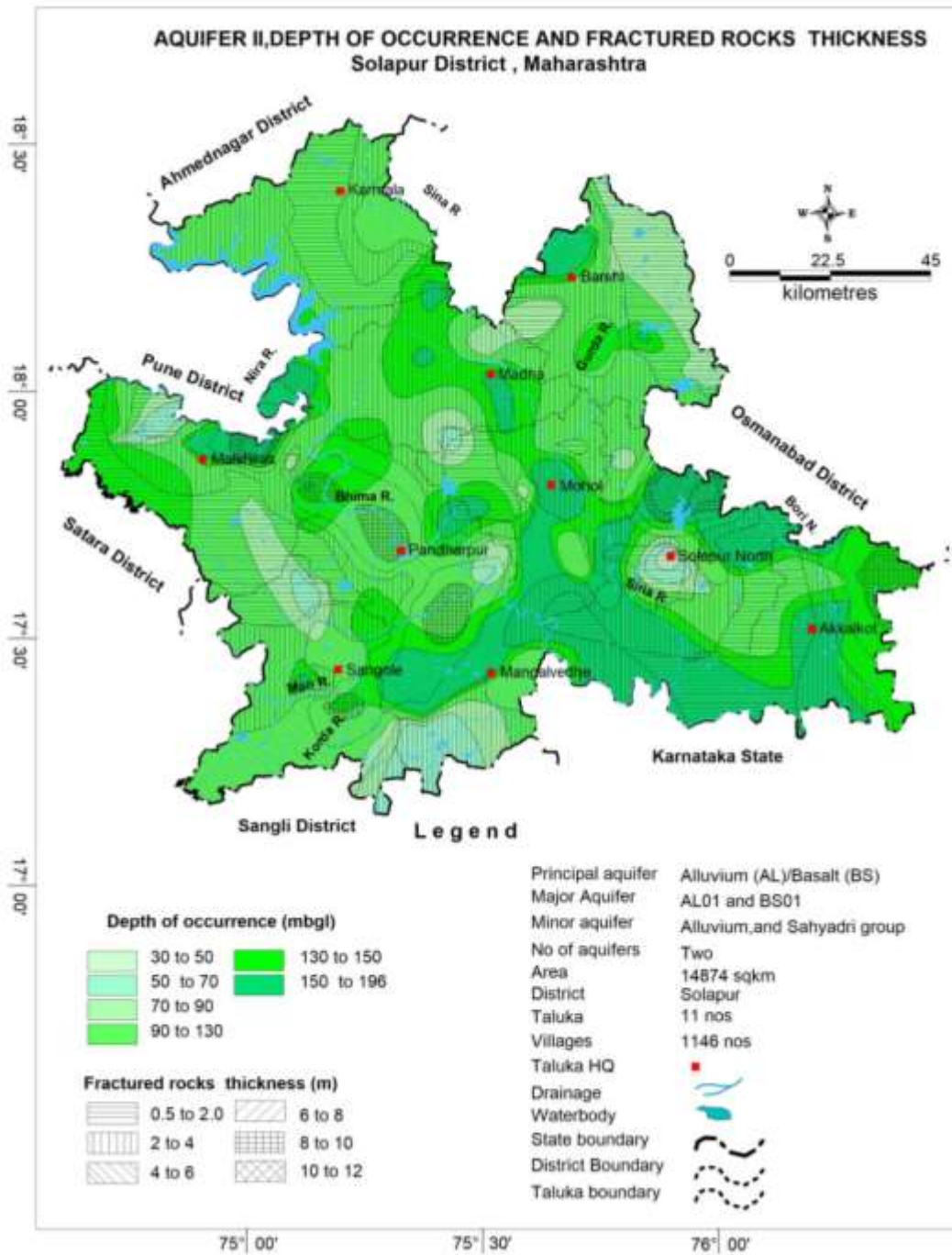


Figure 2.6 Aquifer II, Depth of occurrence and fractured rock thickness

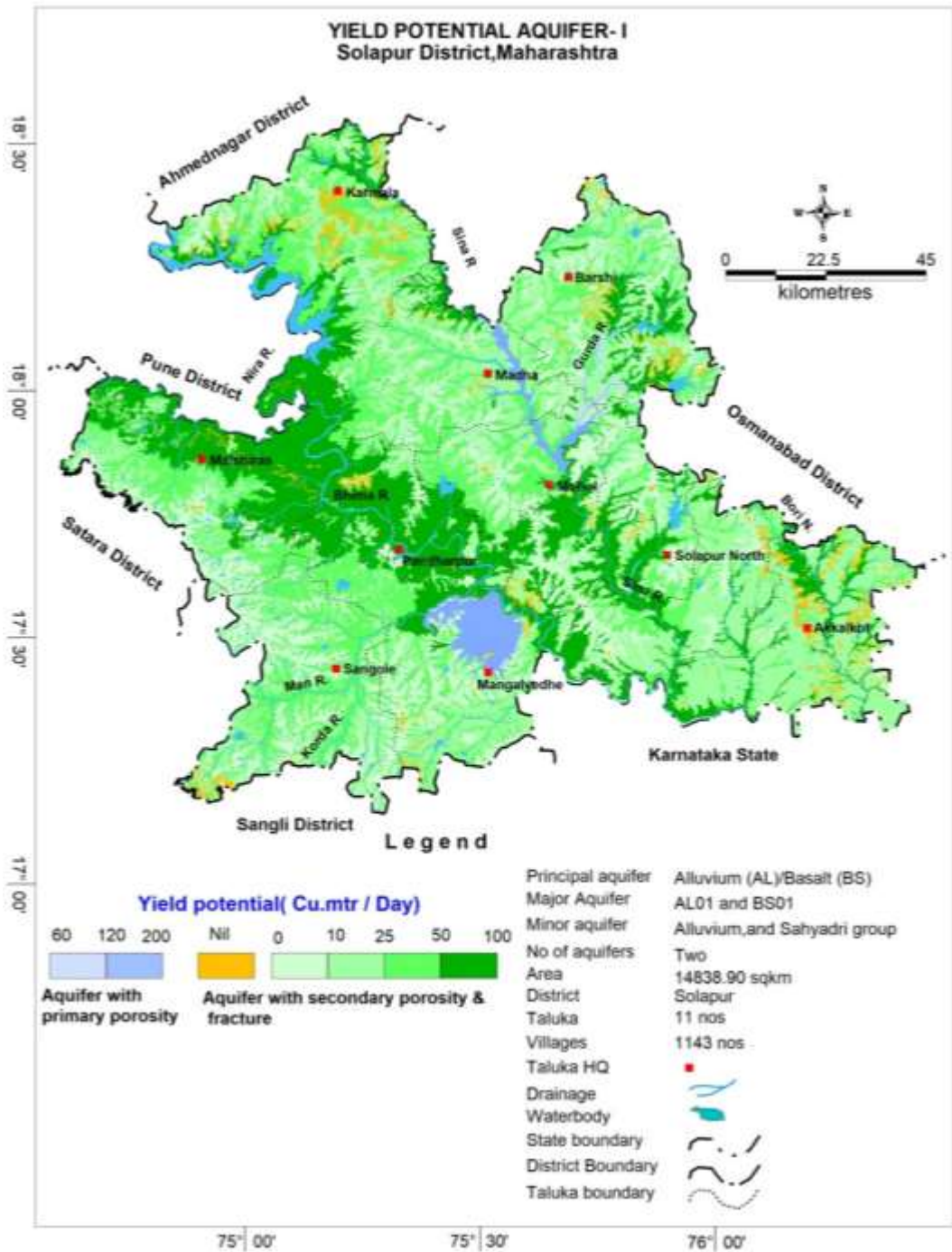


Figure 2.7: Yield potential Aquifer I

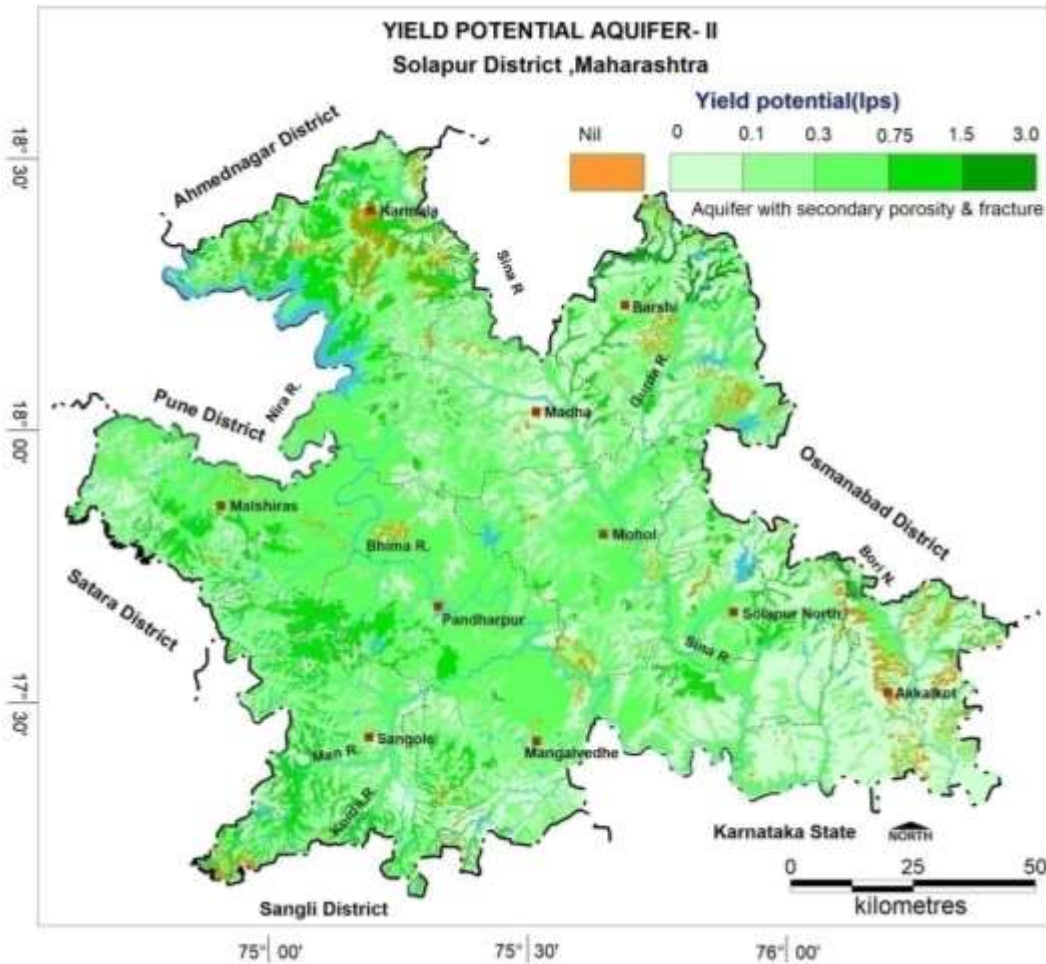


Figure 2.8: Yield potential Aquifer II

2.2.2 Aquifer Parameters

Aquifer parameters are available from ground water exploration carried out in the district as well as from the pumping tests carried out on dugwells in Basaltic and Alluvial terrain. The specific capacity of the wells tapping Deccan Trap Basalt ranges between 1.6 and 5 lps/m of draw down and the transmissivity ranges from 1.25 to 207 m²/day. The specific capacity of dugwells tested in alluvial aquifer ranges between 1.1 and 10 lps/m of drawdown. During the pumping tests conducted on the exploratory wells in Alluvium, the transmissivity was found to vary from 30 to as high as 210 m²/day. The storage coefficient varied between 3x10⁻⁶ and 1.7x10⁻³.

2.2.3 3-D and 2-D Aquifer Disposition

Based on the existing data, aquifer disposition in 3D, Fence diagram, and several hydrogeological sections have been prepared along section lines shown in Figure 2.9 to 2.15 to understand the subsurface disposition of aquifer system.

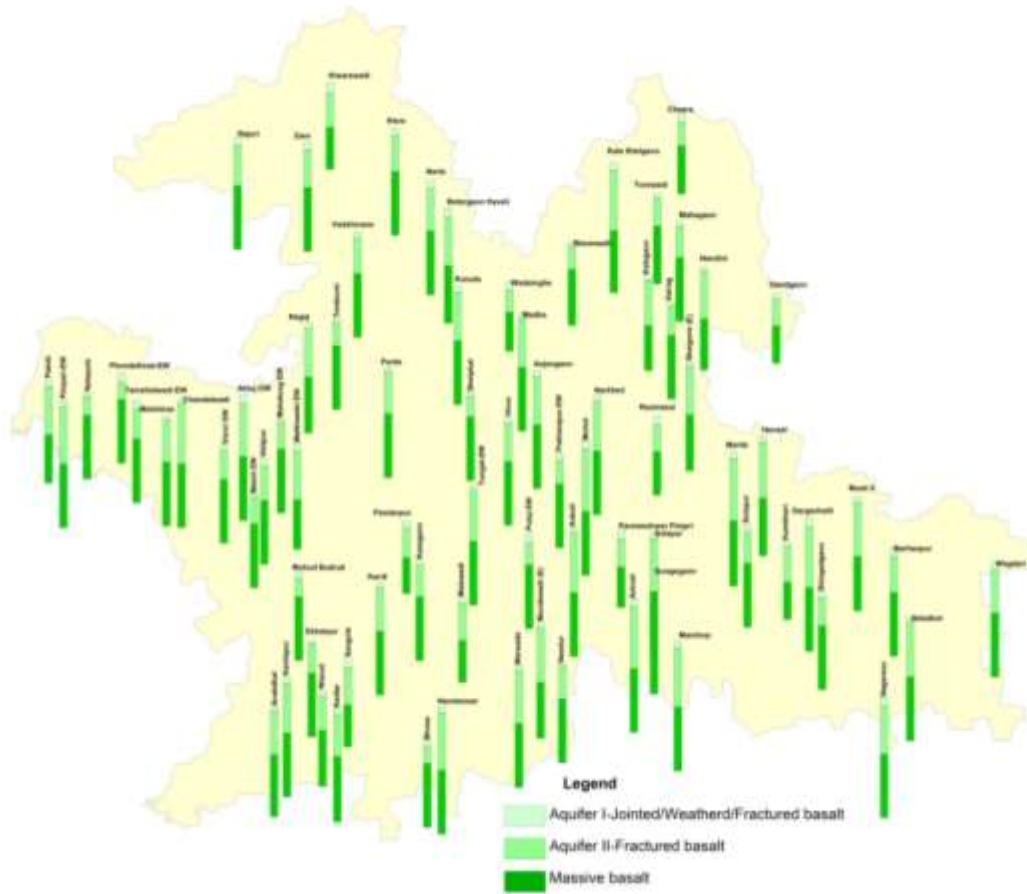


Figure 2.11: Bar Diagram

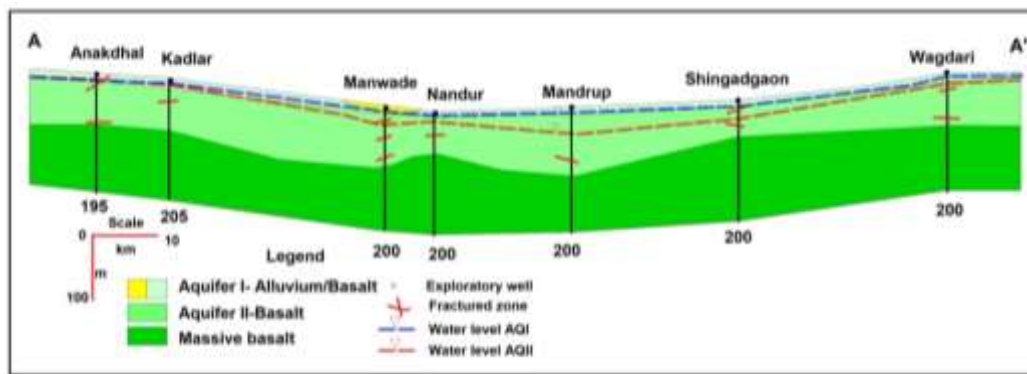


Figure 2.12: Hydrogeological section AA'

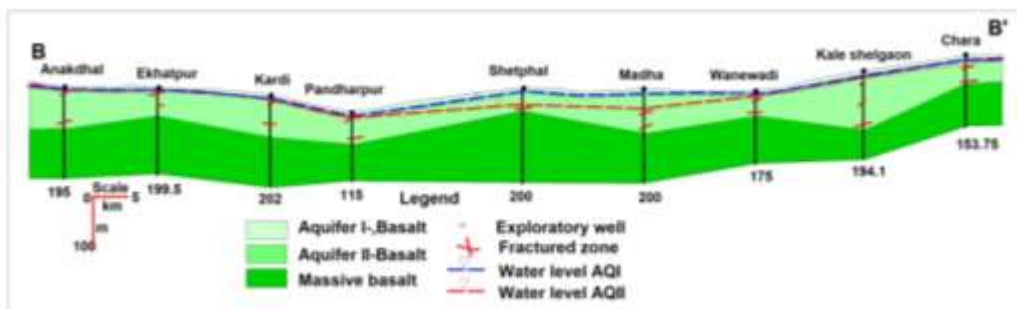


Figure 2.13: Hydrogeological section BB'

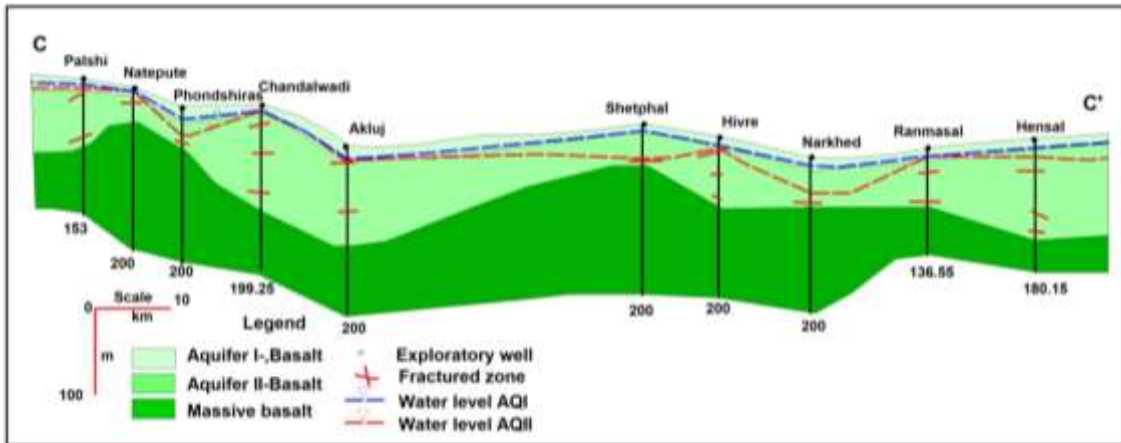


Figure 2.14: Hydrogeological section CC'

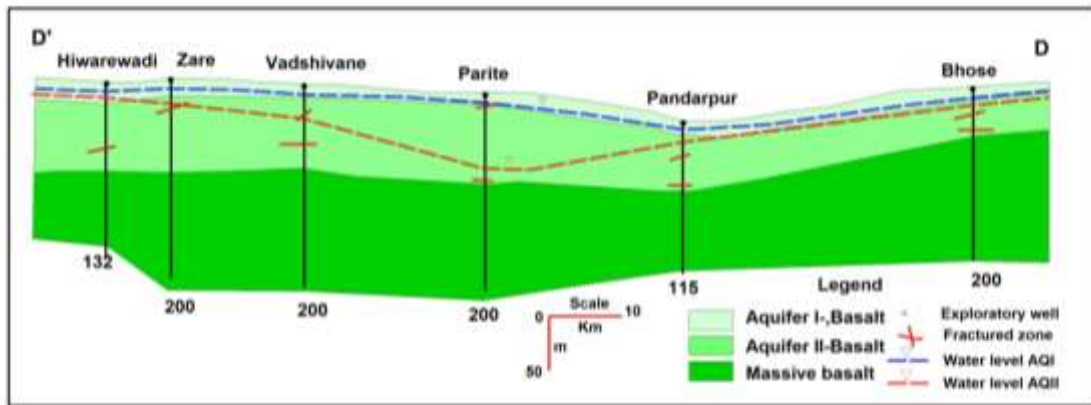


Figure 2.15: Hydrogeological section DD'

3. WATER LEVEL SCENARIO

3.1 Depth to water level (Shallow Aquifer-I)

The Depth to water level depends on the hydrogeological properties the rock formations, level of ground water development and topography of the area. Generally, it rises during the monsoon period and gradually decline in water level after monsoon till the next monsoon is arrived in the district. Central Ground water Board, Central Region has established 58 ground water monitoring stations in the entire district and periodically monitors it 4 times in a year, i.e., January, May (Premonsoon), August and November (Postmonsoon). Apart from this, under Naquim studies 160 key observation wells were also established and monitored during the year 2017. Ground water Survey and Development Agency also monitored 199 wells in the entire district. These data have been used for the preparation of depth to water level maps of the district. Pre-monsoon and post monsoon water levels along with fluctuation during 2017 and long-term water level trends (2008-2017) are given in **Annexure-II** and **Annexure-III** respectively.

3.1.1 Depth to Water Level – Pre-monsoon (May-2017)

The depth to water levels in Solapur district during May 2017 ranges between 4.1 mbgl (Khatgaon, Karmala taluka) and 23.5 mbgl (Maslechaudhary, Mohol taluka and Tanali, Pandharpur). The depth to water levels less than 5 mbgl is represented as localized pint values and not prominent in the district. The depth to Water levels between 5-10 mbgl is observed in most part of the district and covers about 50% of the area. The depth to Water levels between 10-20 mbgl is observed in central part and east west elongated patch covering parts of Madha, Mohol, Pandharpur, North Solapur and South Solapur talukas. The depth to Water levels between 10-20 mbgl is also observed as small pockets in Karmal, Malshiras, Sangola, Mangalwedha and Barshi talukas. This zone covers about 35% of the district area. The depth to Water levels more than 20 mbgl is observed in small pockets around in central part of the district. The Premonsoon depth to water level map is depicted in **Figure 3.1**.

3.1.2 Depth to Water Level – Post monsoon (Nov-2017)

The depth to water levels in Solapur district during Nov. 2017 ranges between 0.5 (Kuslamb, Barshi taluka and Kavitgaon, Karmala taluka) and 18.5 mbgl (Takali Shikandar, Mohol taluka). Shallow water levels within 2 m bgl are observed in north east part of Barshi, central and north east part of Sangola and small patches observed in Mangalwedha, Madha, Mohol and Karmala talukas. The depth to water levels between 2-5 mbgl is observed in major parts of the district covering Akkalkot, Mangalwedha, Madha, Mohol, karmala, Pandharpur, Barshi and malshiras talukas. It consists of about 60% area of the district. The depth to water levels between 5-10 mbgl is observed in most of the north Solapur, south Solpaur, north west of Malshiras talukas and elongate patches in parts of Pandharpur, Madha, Sangola, Mohol, Karmala and north of Akkalkot talukas. The depth to water levels above 10 mbgl is observed in small patches of north Solpaur, south Solpaur, Pandharpur, Madha and Karmala talukas. The post monsoon depth to water level map is shown in **Figure 3.2**.

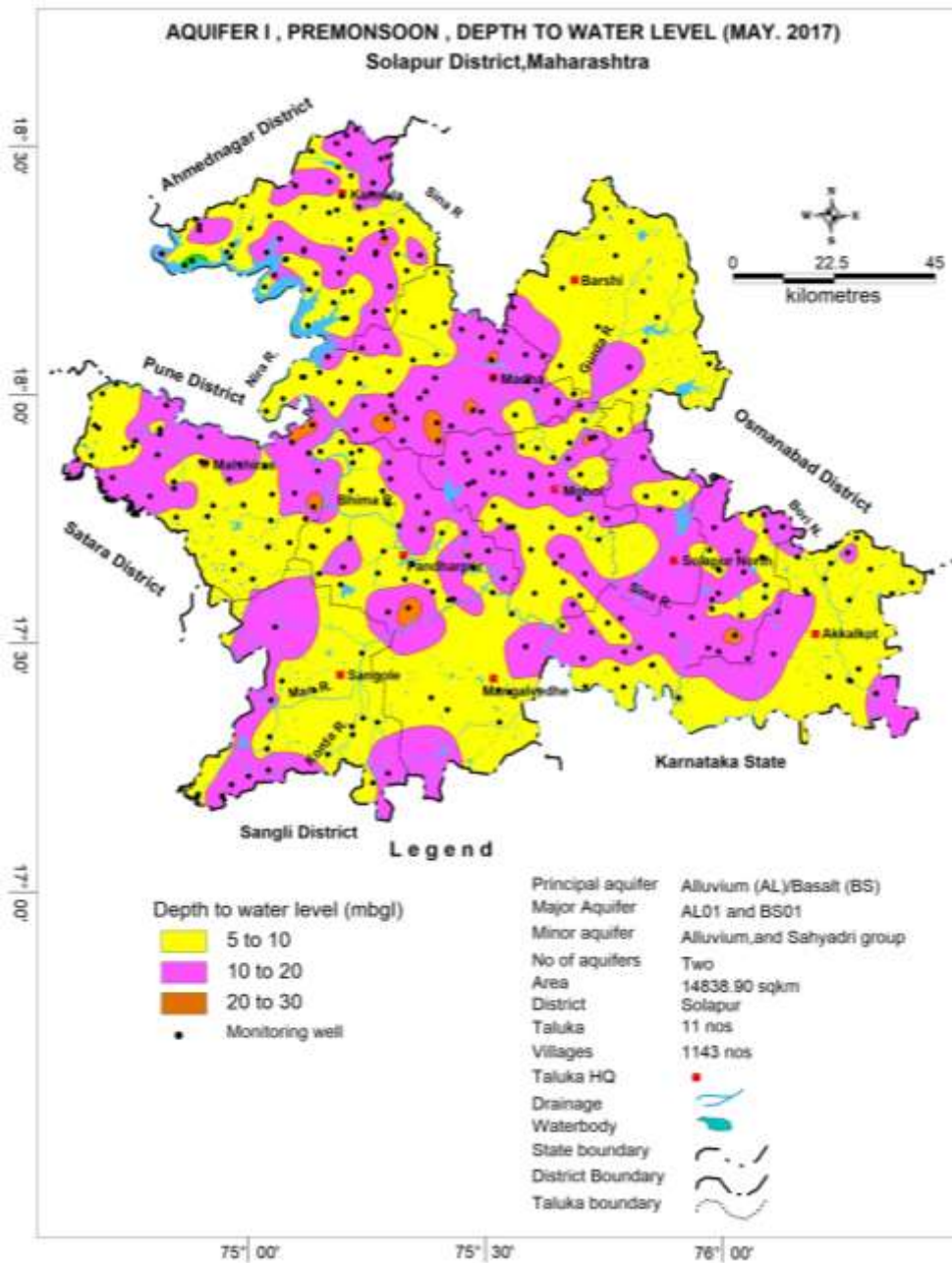


Figure 3.1: DTWL shallow aquifer (May 2017)

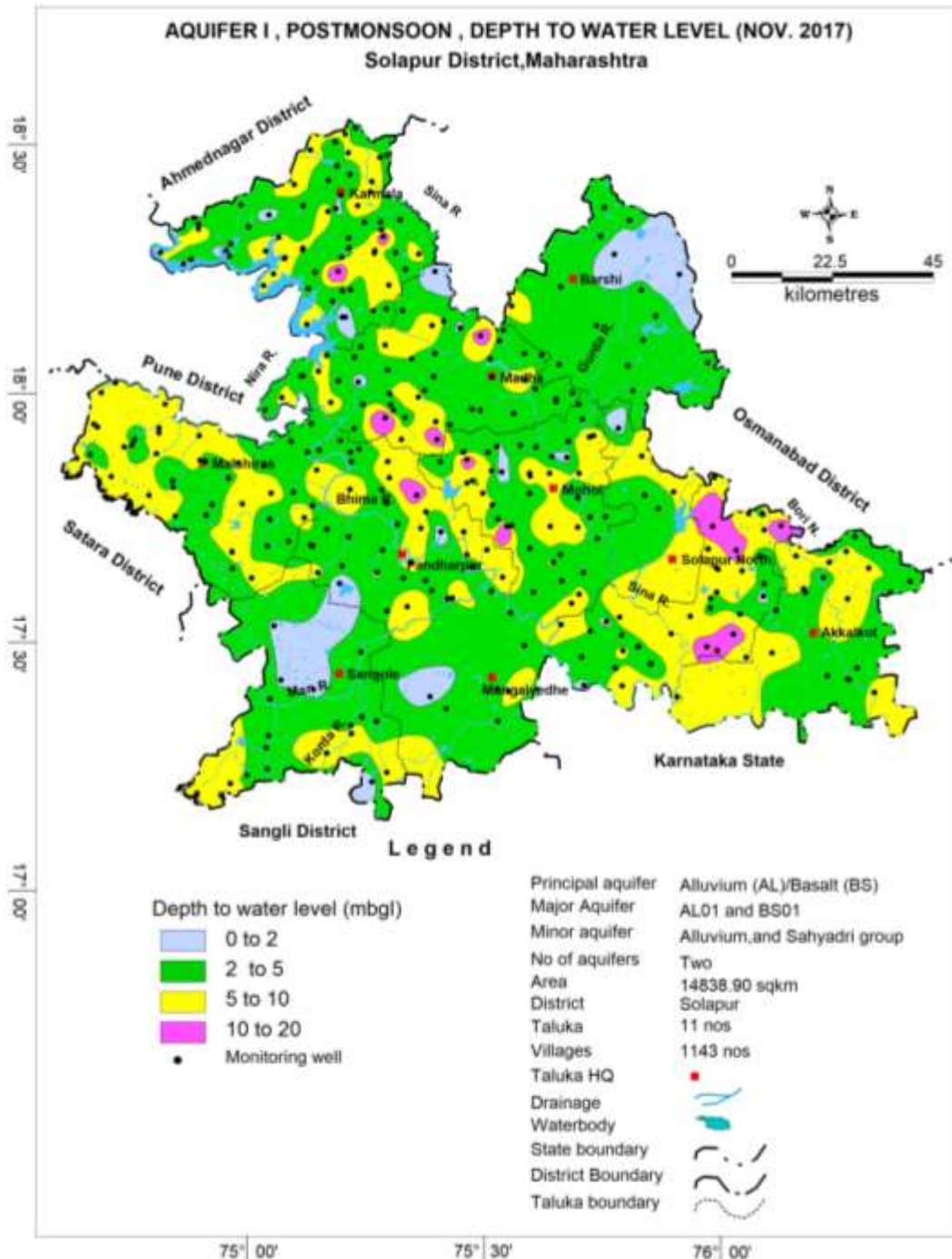


Figure 3.2: DTWL shallow aquifer (Nov 2017)

3.1.3 Seasonal Water Level Fluctuation (May 2017 vs Nov. 2017)

It is observed that minimum water level fluctuation was measured at Medhapur, Pandharpur taluka (0.20 m) while maximum water level fluctuation was measured at Wadachiwadi, Madha taluka (18 m). Rise in water level has been observed in entire district in the range of Rise 0-2, 2-4, 4-6 and >6 m. No decline in water level was observed in the District.

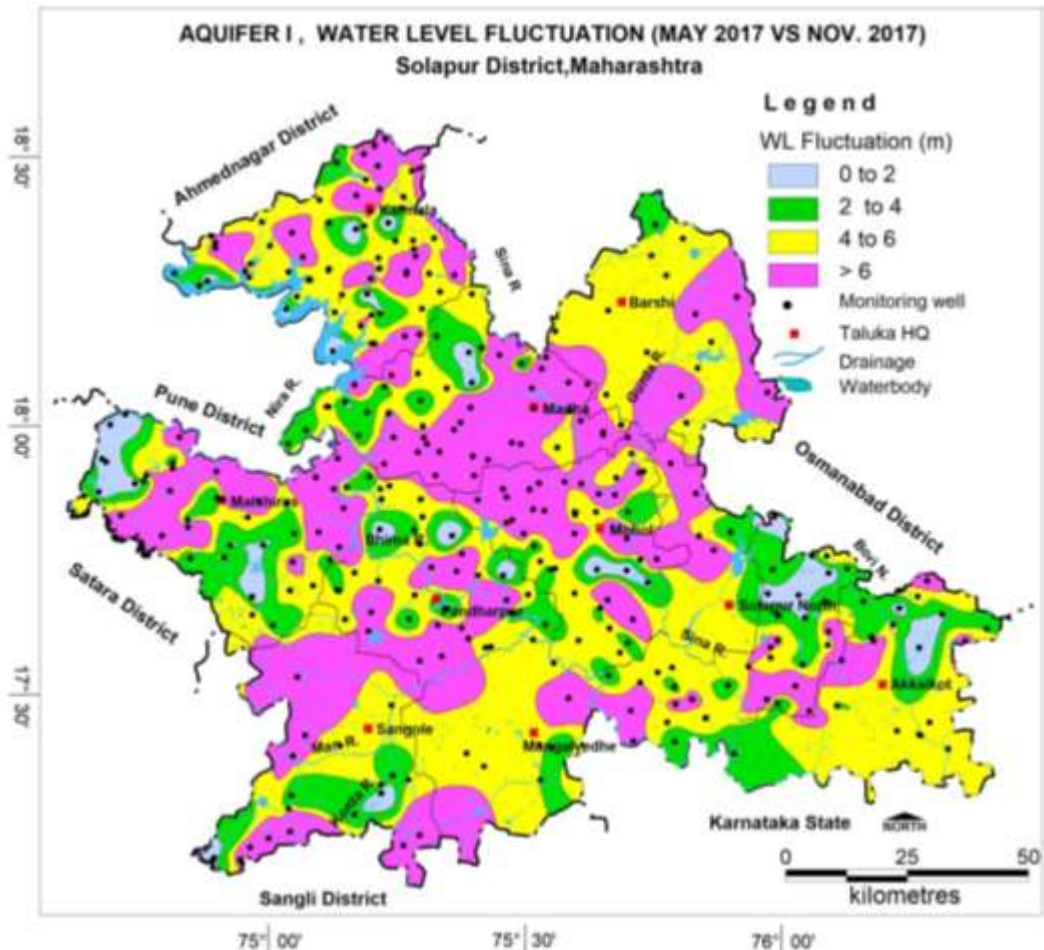


Figure 3.3: Water level fluctuation (May 2017 vs Nov 2017)

3.2 Depth to water level (Deeper Aquifer-II)

3.2.1 Premonsoon Depth to Water Level (May-2017)

The pre-monsoon depth to water levels, during May 2017, range from 8.00 (Kaldar, Sangola taluka) to > 55.00 mbgl (Musti and Kumbhari, South Solapur taluka). The depth to water level less than 10 mbgl is observed in isolated parts of Karmala and Barshi talukas. The major parts of district show depth to water level between > 50 mbgl. The depth to water level between 10 and 30 mbgl is observed in major parts of Sangola, Karmala and Mohol Taluka. The premonsoon depth to water level for Aquifer –II is given in **Figure 3.4** and the details are presented in **Annexure-I (B)**.

3.2.2 Post-monsoon Depth to Water Level (Nov.-2017)

In Aquifer-II, the post monsoon depth to water levels in Solapur District during Nov. 2017 range between 2.00 (Chara, Barshi taluka) and 50.5 mbgl (Naganur, Akkalkot taluka). Depth to water level less than 10 m bgl has been observed in the southern and south-central part of the district and in parts of Karmal, Barshi, Sangola and Mohol talukas. A major part of the district shows deeper water levels ranging between 10 and 20 mbgl. The deepest water level of more than 40 mbgl is observed in the southern parts of Akkalkot and Madha talukas. The post monsoon depth to water level for Aquifer –II is given in **Figure 3.5**.

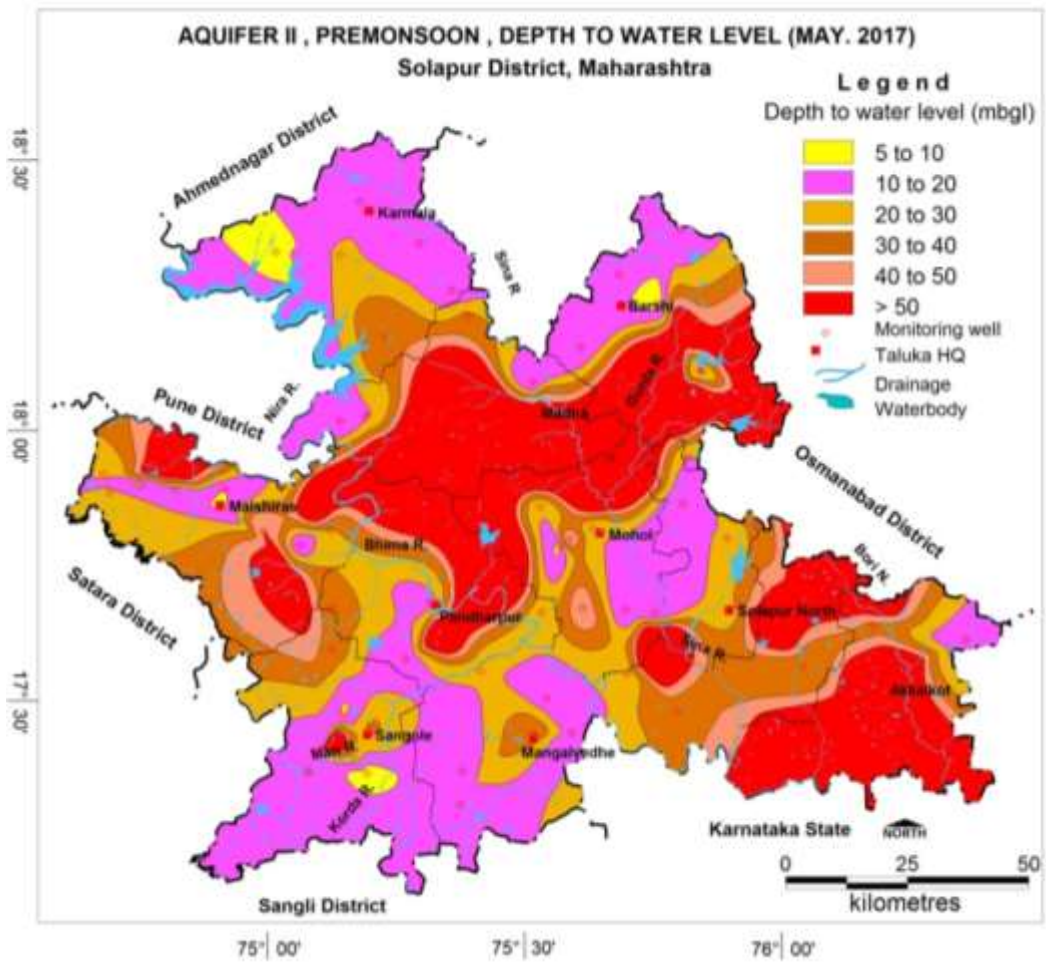


Figure 3.4: DTWL Deeper Aquifer (May. 2017)

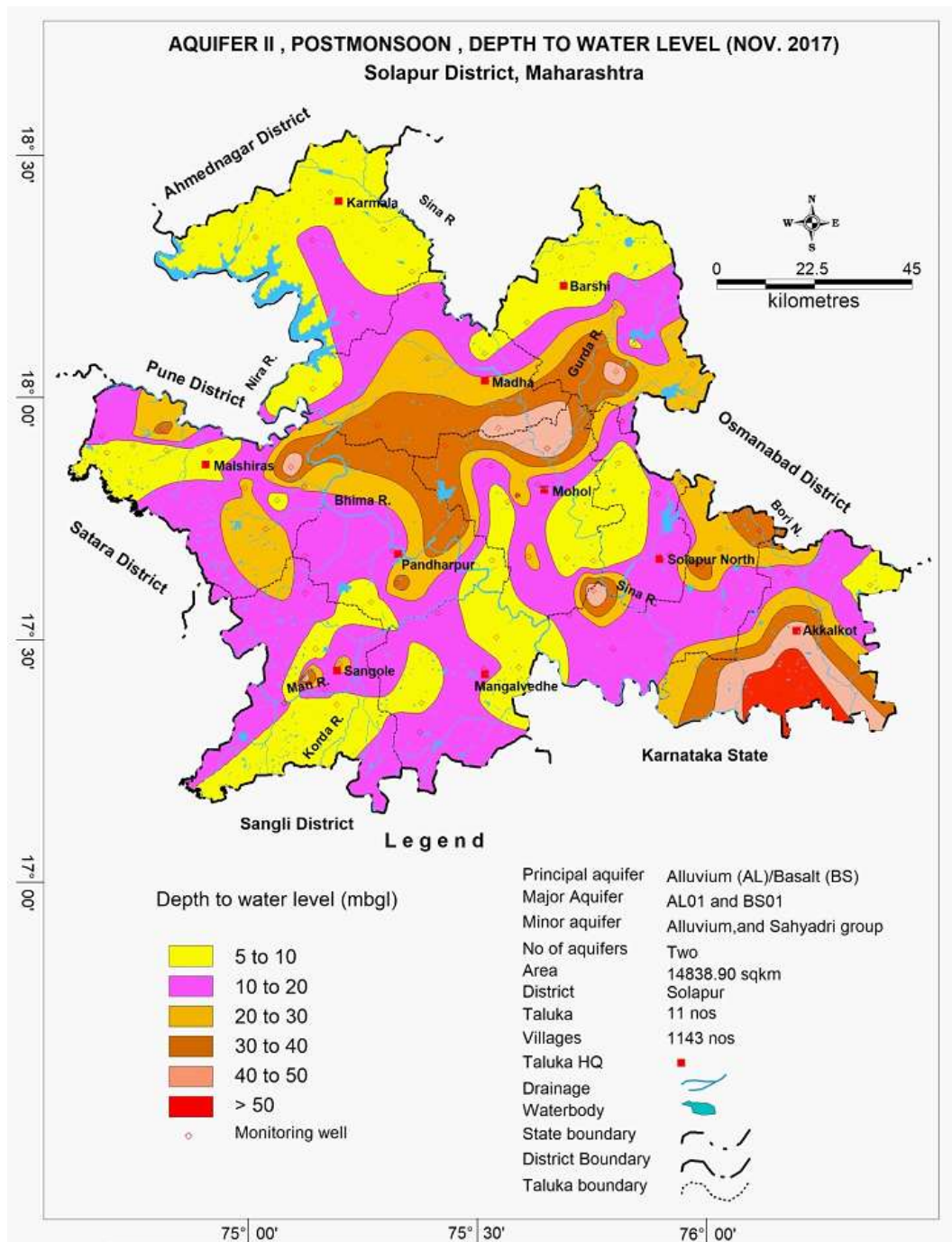


Figure 3.5: DTWL Deeper Aquifer (Nov. 2017)

3.3 Water Level Trend (2008-2017)

3.3.1 Pre-monsoon water levels trend.

In Solapur district, pre-monsoon rise in water levels trend has been recorded at 56 stations and ranges from 0.0.007 (Rajapur, Sangola taluka) to 0.34 m/year (Ajanale, Sangola taluka) while falling trend was observed in 121 stations varying from 0.004 (Dontri, Soalpur taluka) to 0.67 m/year (Hivare, Mohol taluka). During pre-monsoon, declining water level trend has been observed in about 10191sq km area during 2008-17, i.e., 68.4% of the area. Significant decline more than 0.20 m/year has been observed in 876 sq km, i.e., 5.8 % area covering major part of Karmala, Madha and Mohol talukas.

Rise in water level trend has been observed in central part of the district covering major part of Madha, Barshi and Akkalkot talukas. Premonsoon trend map is presented in **Figure 3.6**.

3.3.2 Post-monsoon water levels trend

In Solapur district, post monsoon rise in water levels trend has been recorded at 29 stations and it ranges between 0.009 (Natepute, Malshiras taluka) to 0.34 m/year (Basalegaon, Akkalkot taluka) while falling trend was observed in 148 stations varying from 0.001 (Chikharde, Barshi taluka) to 0.42 m/year (Kurbavi, Malshiras taluka). Rising water level trend has been observed in part of Akkalkot and Barshi Taluka Fall in water level trend has been observed in the major parts of the district. Significant decline more than 0.20 m/year has been observed in 439 sq km area, i.e., 2.94 % area **Figure 3.7**

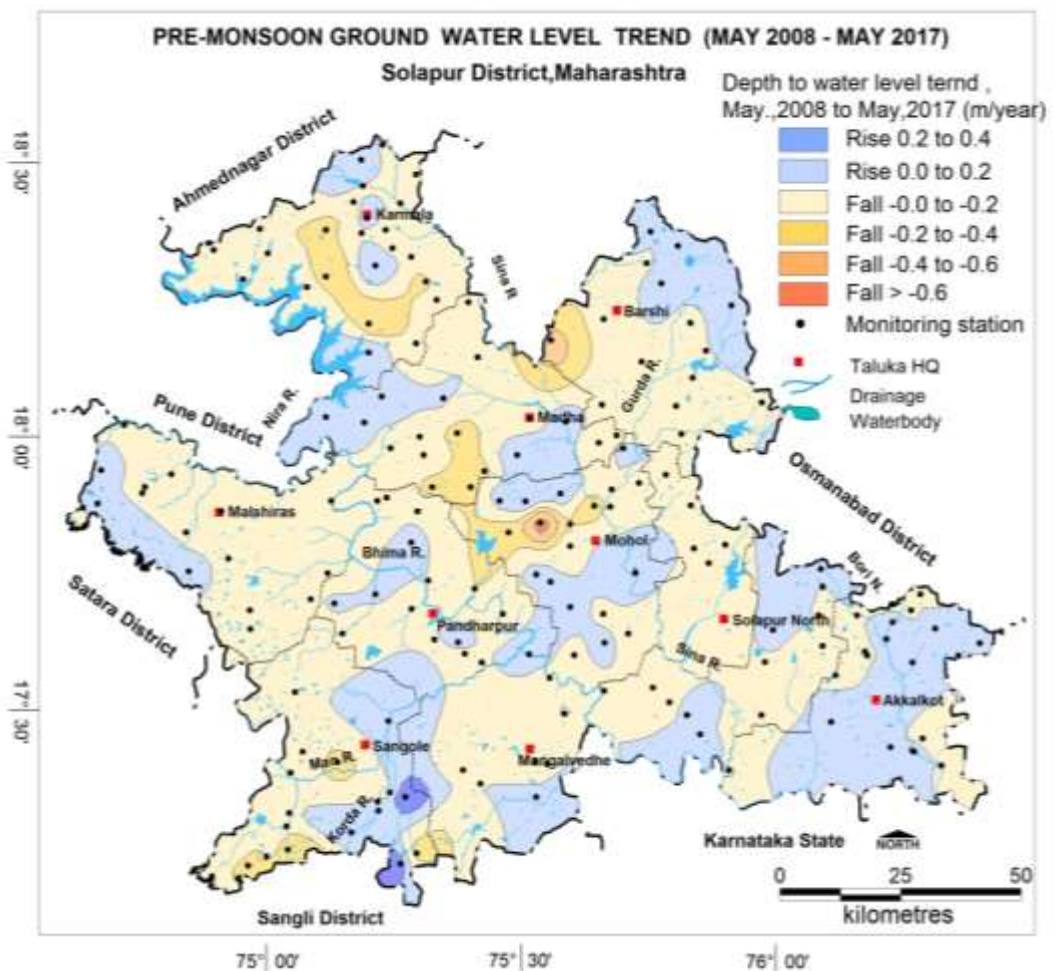


Figure 3.6: Premonsoon decadal water level trend (May 2008-May 2017)

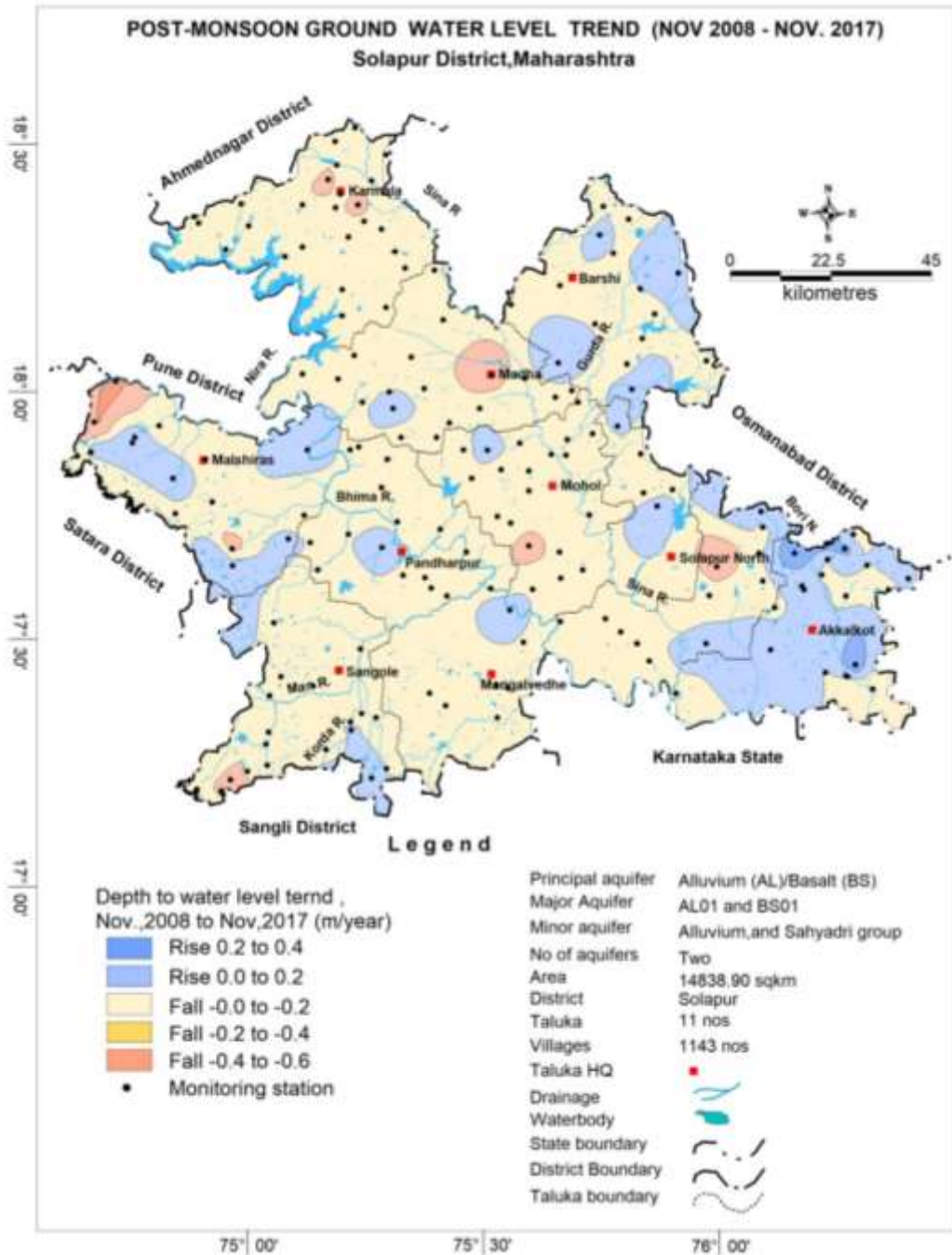


Figure 3.7: Postmonsoon decadal trend (2008-17)

3.4 Hydrograph Analysis

The variation in short term and long-term water level trends may be due to variation in natural recharge due to rainfall and withdrawal of groundwater for various agricultural activity, domestic requirements and industrial needs. The analysis of hydrographs (**Figure 3.8.1 to 3.8.11**) show that the annual rising limbs in hydrographs indicate the natural recharge of groundwater regime due to monsoon rainfall, as the monsoon rainfall is the only natural source of water for recharge to the ground water regime. However, continuous increase in the groundwater extraction vis-à-vis decrease in rainfall is indicated by the recessionary limb. All hydrographs show declining trend

during pre-monsoon period, which indicates water levels going deeper and stress on groundwater use.

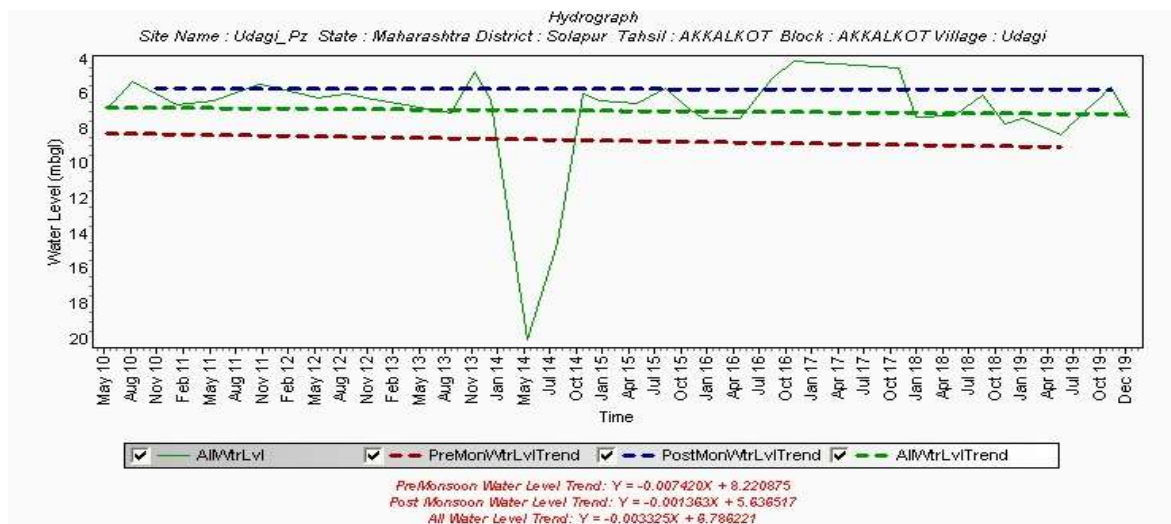


Figure 3.8.1: Hydrograph (2010-19), Udagi, Akkalkot Taluka

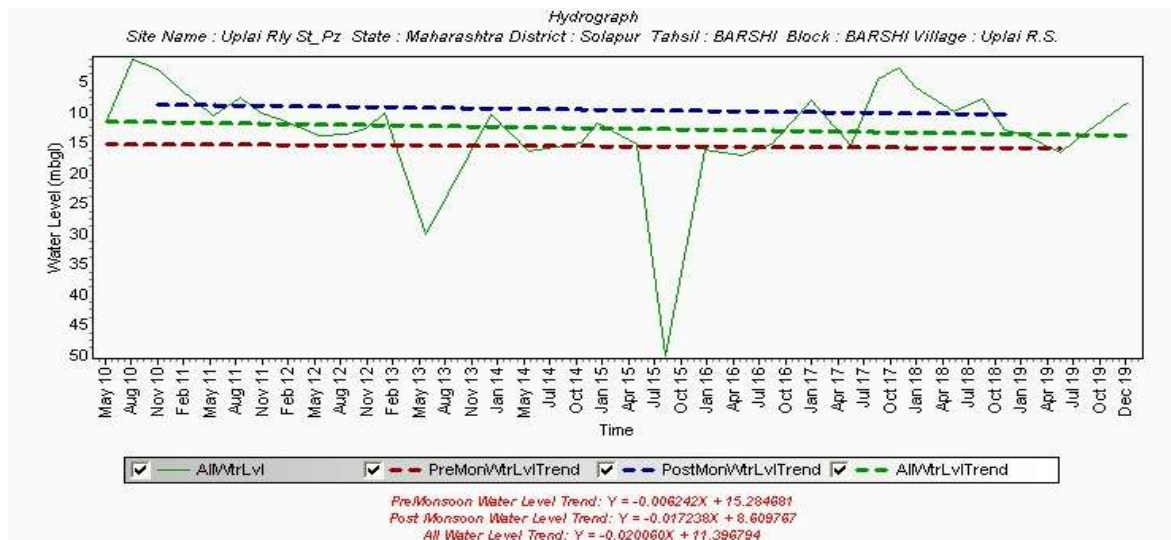


Figure 3.8.2: Hydrograph (2010-19), Uplai Rly Stn, Barshi Taluka

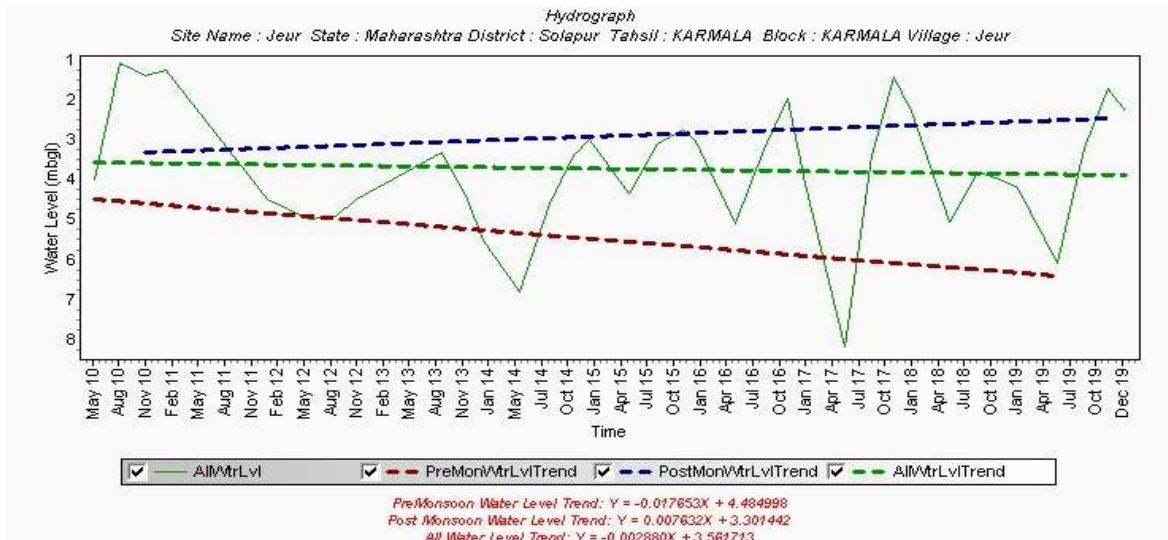


Figure 3.8.3: Hydrograph (2010-19), Jeur, Karmala Taluka

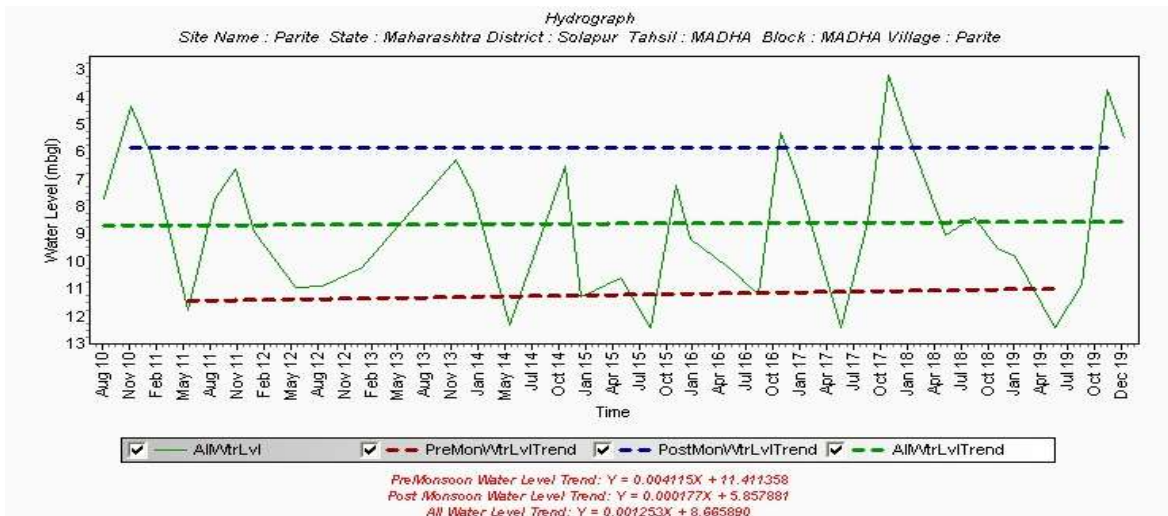


Figure 3.8.4: Hydrograph (2010-19), Parite, Madha Taluka

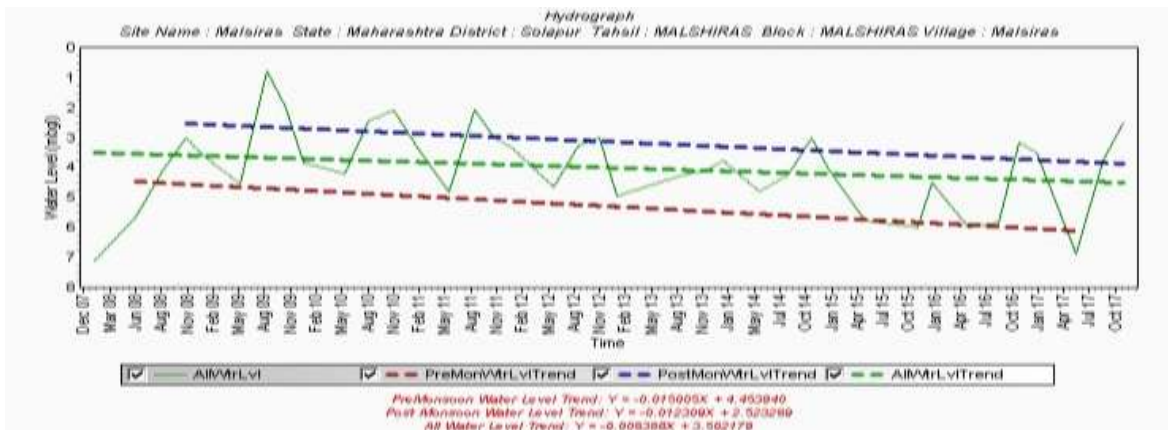


Figure 3.8.5: Hydrograph (2007-17), Malshiras, Malshiras Taluka

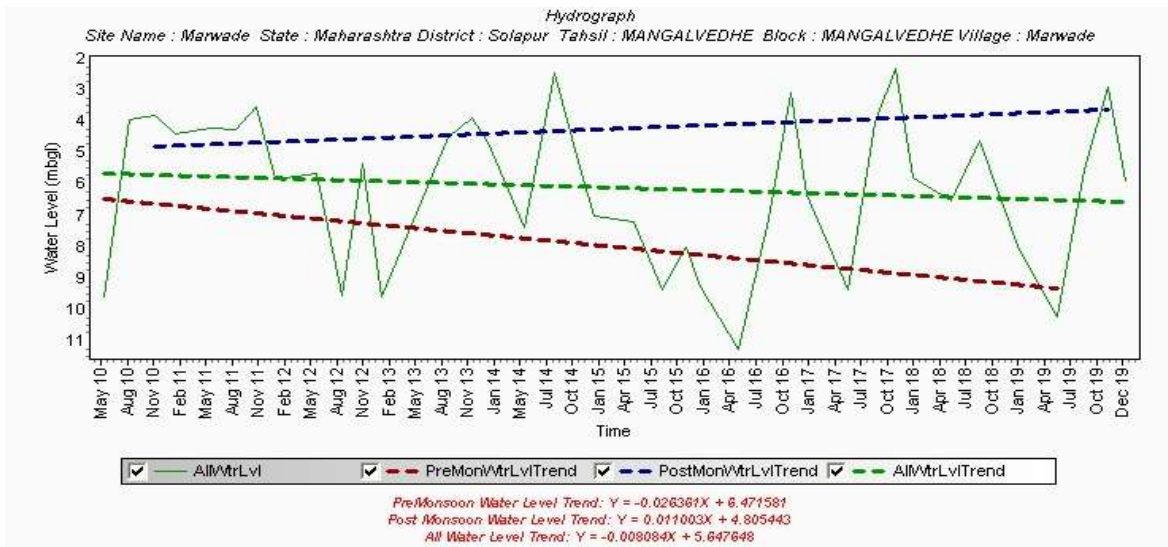


Figure 3.8.6: Hydrograph (2010-19), Marwade, Mangalvedhe Taluka

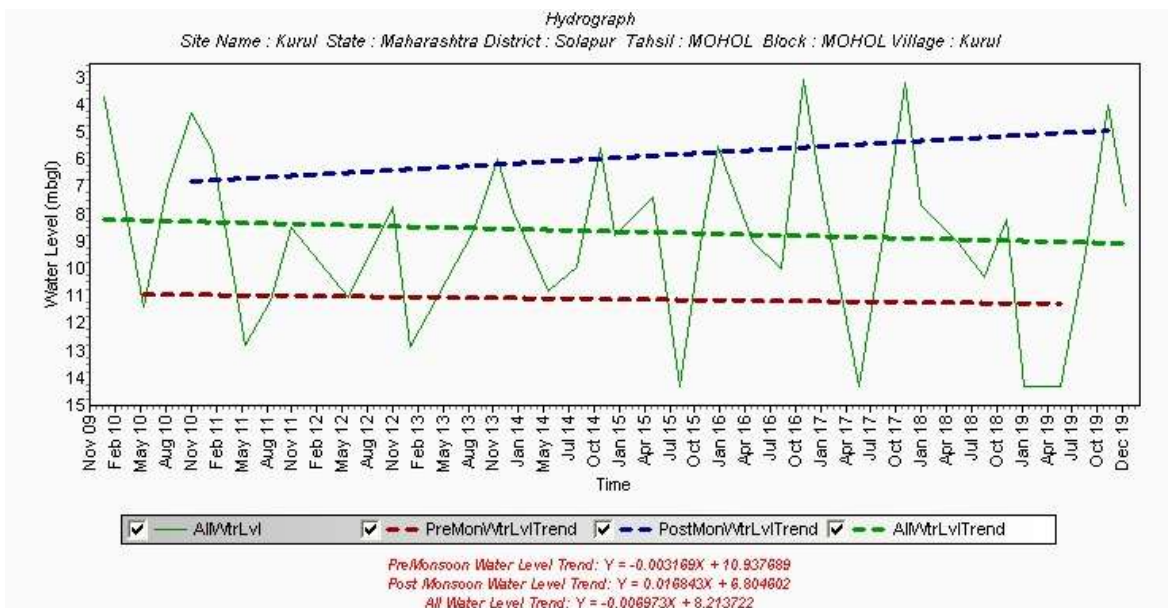


Figure 3.8.7: Hydrograph (2010-19), Kurul, Mohol Taluka

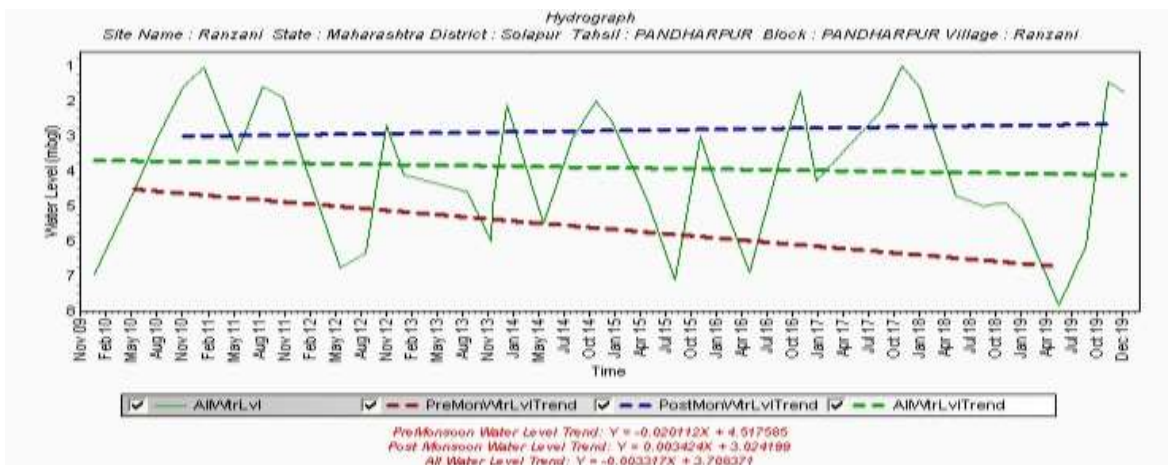


Figure 3.8.8: Hydrograph (2010-19), Ranzani, Pandharpur Taluka

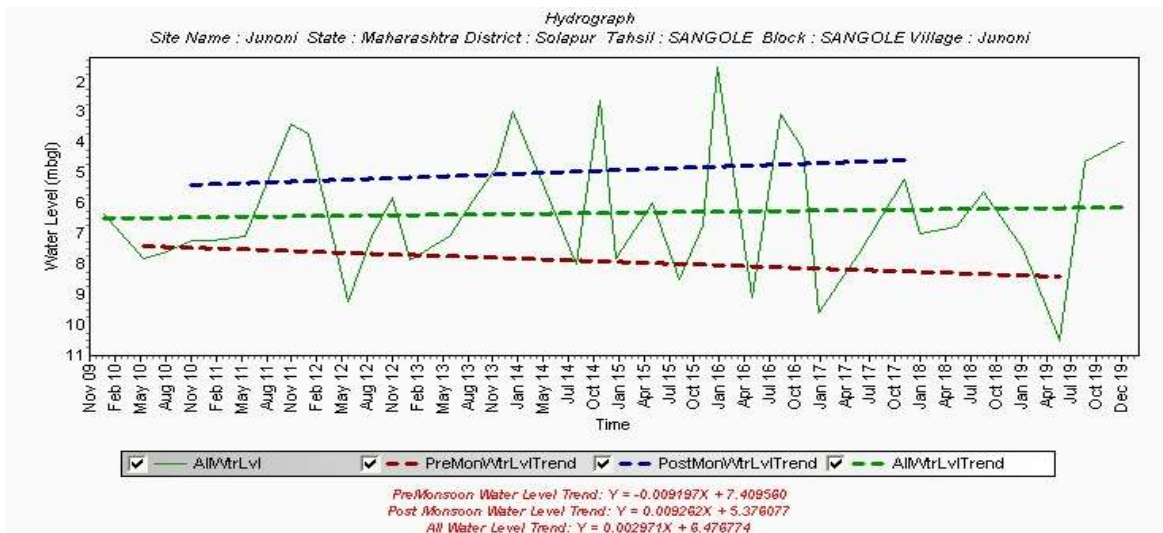


Figure 3.8.9: Hydrograph (2010-19), Junoni, Sangole Taluka

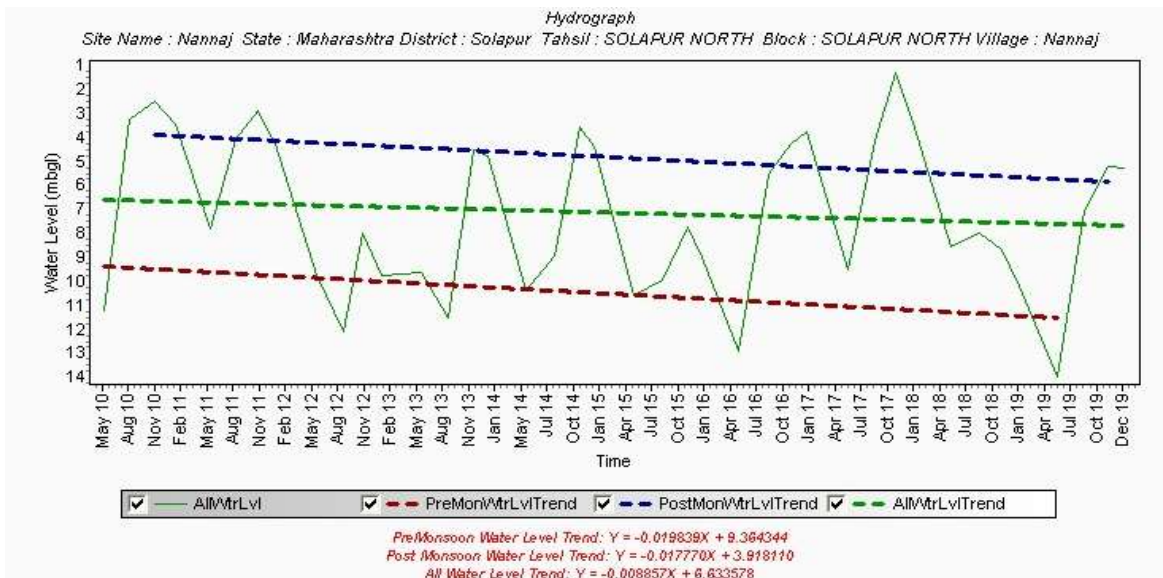


Figure 3.8.10: Hydrograph (2010-19), Nannaj, Solapur North Taluka

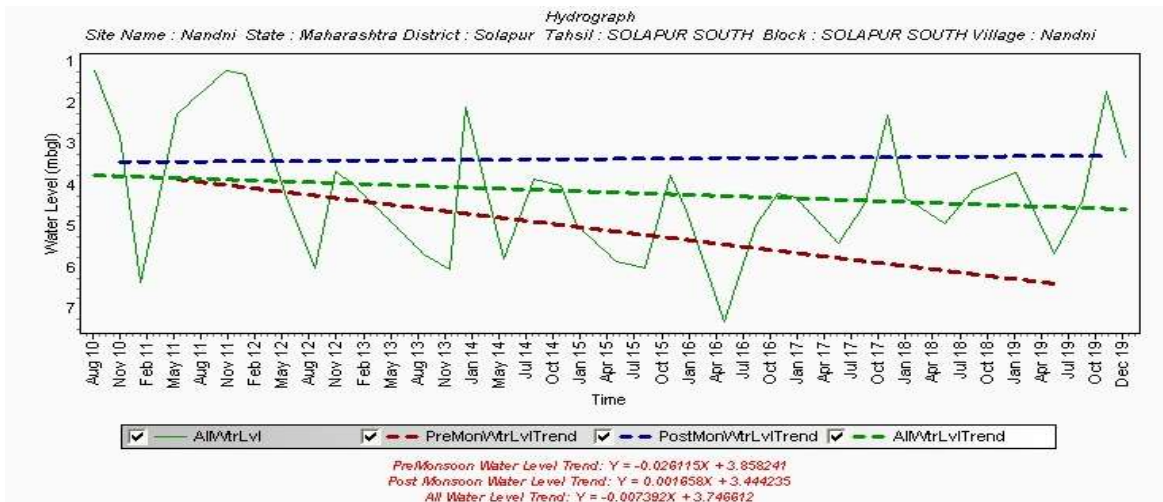


Figure 3.8.11: Hydrograph (2010-19), Nandni, Solapur South Taluka

4. GROUND WATER QUALITY

Water sampling is being done every year from GWM wells during pre-monsoon period (May). The data gap analysis has been carried out to find out the adequacy of information on water quality and identified additional locations, 90 for shallow and 15 for deeper aquifers. Ground water quality data of 99 monitoring wells of CGWB and GSDA representing shallow aquifer and 104 samples data from earlier studies representing shallow aquifer have been utilised to decipher the quality scenario of shallow aquifer. 189 exploratory wells tubewells / borewells of CGWB and GSDA and 119 exploratory well data from earlier studies representing deeper aquifer have been utilised to decipher the quality scenario of deeper aquifer. The aquifer wise ranges of different chemical constituents present in ground water are given in **Table 4.1**. The details of water quality analysis for shallow aquifer are given in **Annexure-IV** and for deeper aquifer are given in **Annexure-V**.

Table 4.1: Aquifer wise ranges of chemical constituents in Solapur district

Constituents	Shallow aquifer		Deeper aquifer	
	Min	Max	Min	Max
pH	6.5	9.2	6.5	9.5
EC	298	10000	375	2910
TDS	191	6400	200	1885
TH	40	2560	25	960
Calcium	8	926	0	245
Magnesium	0	501	0	109
Potassium	0.03	78.45	0	8.3
Sodium	3.9	796	0	400
Bi-carbonate	19.5	658	11	403
Chloride	70	1550	0	440
Sulphate	3	1260	0	752
Nitrate	0	879	0	220
Fluoride	0	1.5	0	12

4.1 Electrical Conductivity (EC)

Distribution of Electrical Conductivity in Shallow Aquifer:

The EC in shallow aquifer varies between 298 (Musti, South Solapur taluka) and 10000 $\mu\text{S}/\text{cm}$ (Akole kathi, North Solapur taluka). Out of 189 samples collected from dug wells, 14 samples are having EC in range of 2250 to 3000 $\mu\text{S}/\text{cm}$ and only 17 samples have shown EC > 30000 $\mu\text{S}/\text{cm}$. It is observed that the concentration of high EC > 2250 $\mu\text{S}/\text{cm}$ has been observed in patches in Pandharpur, North and south Solapur taluka and small parts of Madha and Malshiras taluka. The distribution of electrical conductivity in shallow aquifers is shown in fig: 7.1 and analytical data is presented in **table 4.2**.

Distribution of Electrical Conductivity in Deeper Aquifer:

The concentration of EC in deep aquifer varies between 375 (Shelgone, Barshi taluka) and 2910 $\mu\text{S}/\text{cm}$ (Alagi, Akkalkot taluka). Out of 119 samples collected from tube wells/bore wells, 5 samples are having EC more than 2250 $\mu\text{S}/\text{cm}$. It is observed that the concentration of high EC more than 2250 has been observed in parts of South Solapur

and Akkalkot talukas The distribution of electrical conductivity in deeper aquifers is shown in **fig: 4.2** and analytical data is presented in **table 4.2**.

Table 4.2: Aquifer wise Electrical conductivity data

S.No.	EC	shallow aquifer		Deeper Aquifer	
	(μ S/cm)	No. of samples	% of samples	No. of samples	% of samples
1	< 250	0	0.00	0	0
2	>250-750	27	16.07	49	41.18
3	>750-2250	110	65.48	65	54.62
4	2250-3000	14	8.33	5	4.20
5	3000-5000	12	7.14	0	0
6	5000	5	2.98	0	0
Total samples		168	100	119	100

4.2 Nitrate:

Nitrogen in the form of dissolved nitrate nutrient for vegetation, and the element is essential to all life. The major contribution in ground water is from sewage, waste disposal, nitrate fertilizer and decaying of organic matter. In Solapur district nitrate concentration varies between 0 to 879 mg/l. As per BIS (2012) the desirable limit is 45 mg/l. In shallow aquifer, 189 samples were analysed, out of these 54 water samples show the nitrate concentration exceeded the desirable limit of 45 mg/l. The high concentration of Nitrate may be due to domestic waste and sewage in the urban and rural parts of district. In deeper aquifer, 119 wells analysed, out of these 15 water samples show that the nitrate concentration exceeded the desirable limit of 45 mg/l. The deeper aquifer is also affected by nitrate contamination, it may be due to percolation of nitrate contaminants from the ground surface as there are no other reasons for nitrate contamination in deeper aquifers. Aquifer wise nitrate concentration is given in **table 4.3**.

4.3 Fluoride:

In shallow aquifer, concentration of fluoride ranges from 0.01 to 1.5 mg/l. out of 169 samples analysed, only 6 samples show fluoride concentration more than 1 mg/l. In shallow aquifer. In Deeper Aquifer, concentration of fluoride ranges from 0.22 to 12 mg/l. out of 95 samples analysed, 53 samples show fluoride concentration more than 1 mg/l. In Deeper aquifer, the highest concentration of fluoride is found in Madha, South Solapur and North Solapur Talukas, it may be due to the lithological reason only. Aquifer wise fluoride concentration is given in **table 4.3**.

Table 4.3: Aquifer wise nitrate and Fluoride concentration in Solapur district

Taluka	No₃> 45 mg/l		fluoride >1 mg/l	
	No of samples	No of samples	No of samples	No of samples
	Shallow Aquifer	Deeper Aquifer	Shallow Aquifer	Deeper Aquifer
AKKALKOT	0	1	0	2
BARSHI	2		0	2
KARMALA	11	2	0	2
MADHA	11	4	0	10

Taluka	No₃> 45 mg/l		fluoride >1 mg/l	
	No of samples	No of samples	No of samples	No of samples
	Shallow Aquifer	Deeper Aquifer	Shallow Aquifer	Deeper Aquifer
MALSHIRAS	0	1	0	3
MANGALVEDHE	1	1	0	3
MOHOL	9		0	4
PANDHARPUR	7	1	0	4
SANGOLA	1		0	2
SOLAPUR NORTH	3	3	0	6
SOLAPUR SOUTH	9	2	0	4
Total	54	15	0	42

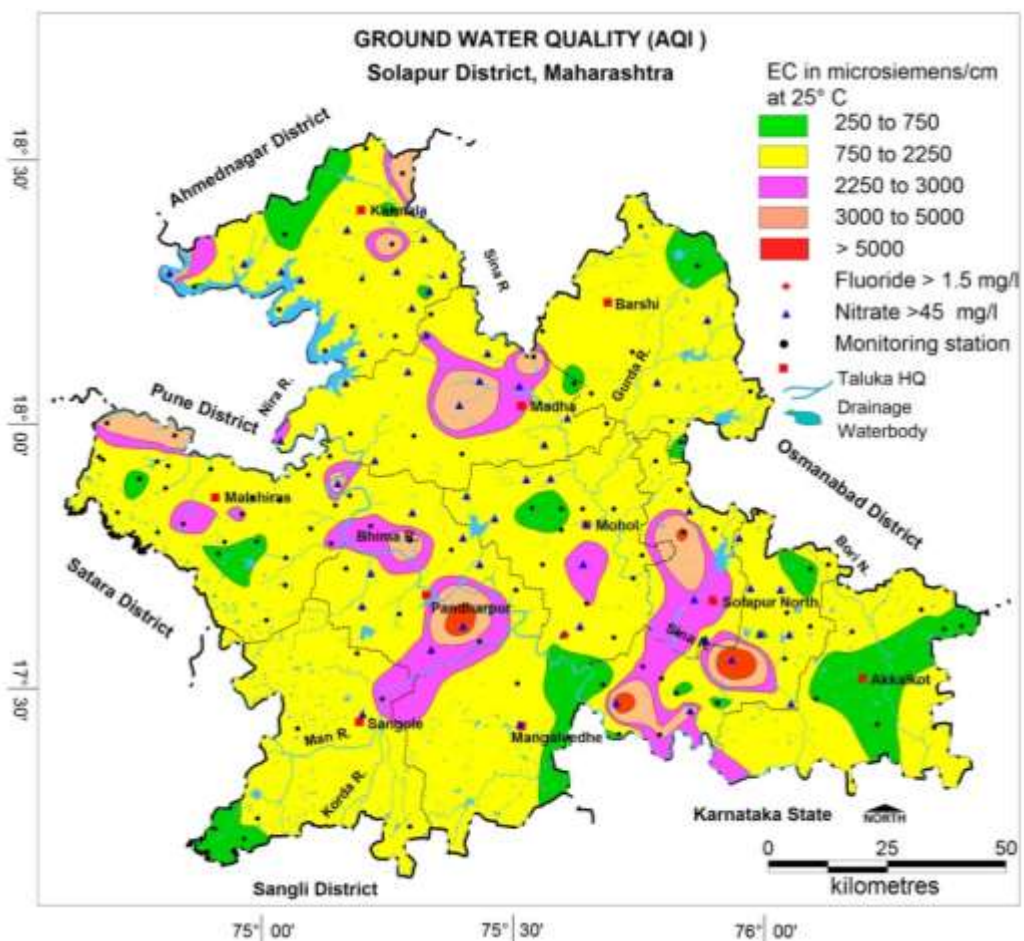


Figure 4.1: Ground water quality, Aquifer-I

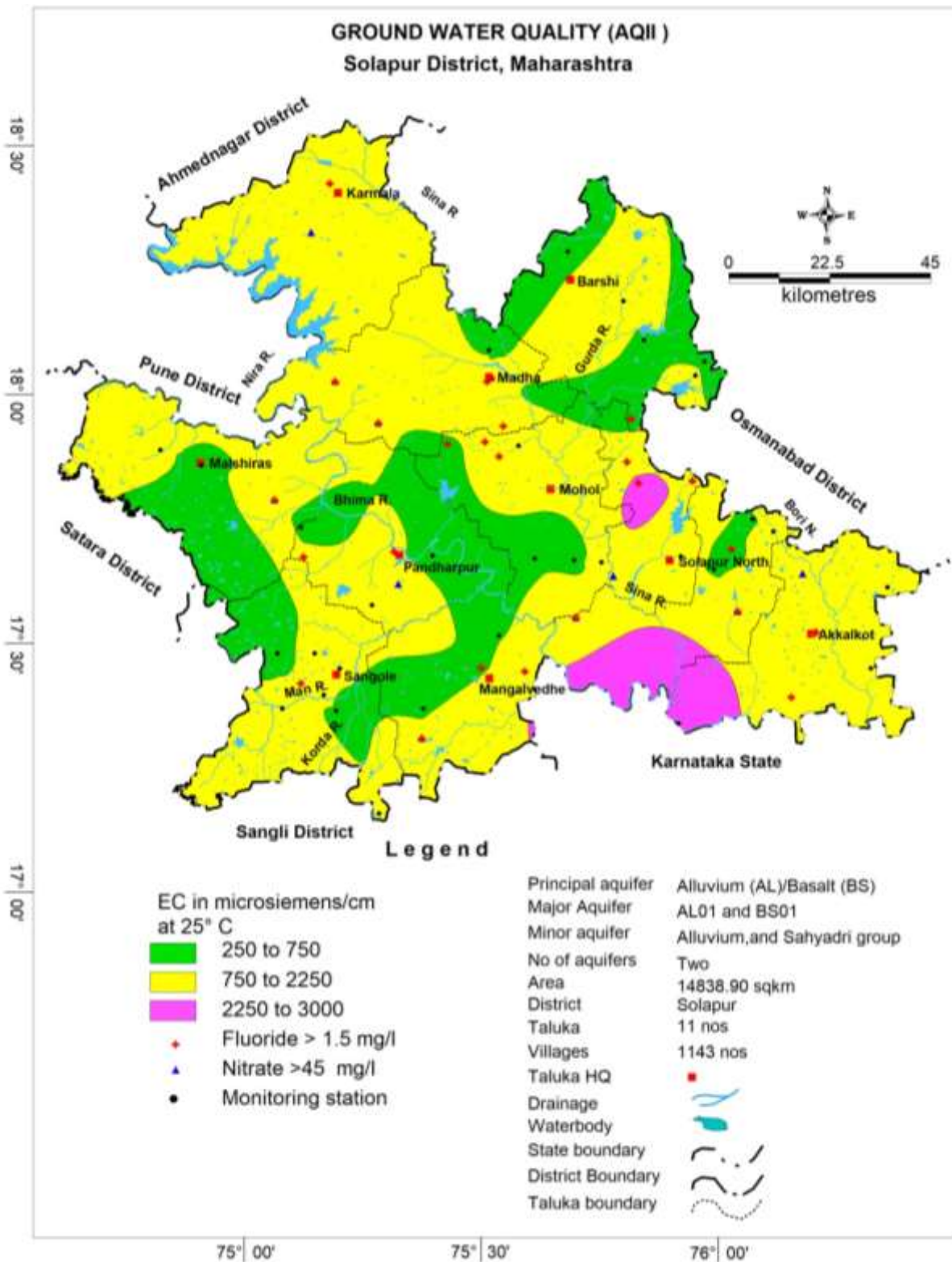


Figure 4.2: Ground water quality, Aquifer-II

4.4 Suitability of ground water for drinking purpose

In shallow aquifer, 6.41 % samples are having TDS concentration more than maximum permissible limit (MPL) and 55.13 % of samples have TDS concentration above the Desirable limit (DL) but below the MPL. The water from such area is not fit for drinking purpose if directly consumed without treatment. It is also seen that about 1 to 31 % samples are beyond the maximum permissible limit for the parameters like TH, Ca,

Mg, Cl, SO₄ and NO₃ indicating that the water is not suitable for drinking purpose. Concentration of Chemical constituents in shallow Aquifer is given in **table 4.4**.

In Deeper aquifer, 7.56 % samples are having TDS concentration more than the Desirable limit (DL) but below the MPL. The water from such area is not fit for drinking purpose if directly consumed without treatment. It is also seen that about 2 to 15 % samples are beyond the maximum permissible limit for the parameters like TH, Ca, Mg, Cl, SO₄ and NO₃ indicating that the water is not suitable for drinking purpose. Concentration of Chemical constituents in shallow Aquifer is given in **table 4.5**.

Table 4.4: Concentration of Chemical constituents in shallow Aquifer

Parameter	Drinking water Standards (IS-10500-2012)		Total no of ground water samples	Shallow aquifer					
				Samples (<DL)		Samples (DL-MPL)		Samples (>MPL)	
				No	%	No	%	No	%
pH	6.5-8.5	-	168	156	92.86	12	7.14		0.00
TDS	500	2000	78	30	38.46	43	55.13	5	6.41
TH	300	600	168	56	33.33	73	43.45	39	23.21
Ca (mg/L)	75	200	168	40	23.81	75	44.64	53	31.55
Mg (mg/L)	30	100	168	59	35.12	82	48.81	27	16.07
Cl (mg/L)	250	1000	168	114	67.86	51	30.36	3	1.79
SO ₄ (mg/L)	200	400	168	120	71.43	30	17.86	18	10.71
NO ₃ (mg/L)	45	No relax	168	114	67.86			54	32.14
F (mg/L)	1	1.5	168	168	100.00				

(Here, DL- Desirable Limit, MPL- Maximum Permissible Limit)

Table 4.5: Concentration of Chemical constituents in Deeper Aquifer

Parameter	Drinking water Standards (IS-10500-2012)		Total no of ground water samples	Shallow aquifer					
				Samples (<DL)		Samples (DL-MPL)		Samples (>MPL)	
				No	%	No	%	No	%
pH	6.5-8.5	-	119	110	92.44	9	7.56		0.00
TDS	500	2000	119	57	47.90	62	52.10	0	0.00
TH	300	600	119	96	80.67	13	10.92	10	8.40
Ca (mg/L)	75	200	119	91	76.47	23	19.33	5	4.20
Mg (mg/L)	30	100	119	98	82.35	18	15.13	3	2.52
Cl (mg/L)	250	1000	119	102	85.71	17	14.29	0	0.00
SO ₄ (mg/L)	200	400	119	89	74.79	18	15.13	12	10.08

NO ₃ (mg/L)	45	No relax	98	83	84.69		0.00	15	15.31
F (mg/L)	1	1.5	107	65	60.75	42	39.25		

(Here, DL- Desirable Limit, MPL- Maximum Permissible Limit)

4.5 Suitability of ground water for irrigation

The water used for irrigation is an important factor in productivity of crop, its yield and quality of irrigated crops. The quality of irrigation water depends primarily on the presence of dissolved salts and their concentrations. The Electrical Conductivity (EC), Sodium Absorption Ratio (SAR) and Residual Sodium Carbonate (RSC) are the most important quality criteria, which influence the water quality and its suitability for irrigation.

Electrical Conductivity (EC)

The number of dissolved ions in the water is best represented by the parameter electrical conductivity. The classification of water for irrigation based on the EC values is given in **Table 4.6** and discussed as follows: -

Low Salinity Water (EC: 100-250 $\mu\text{S/cm}$): This water can be used for irrigation with most crops on most soils with little likelihood that salinity will develop.

Medium Salinity Water (EC: 250 – 750 $\mu\text{S/cm}$): This water can be used if moderate amount of leaching occurs. Plants with moderate salt tolerance can be grown in most cases without special practices for salinity control.

High Salinity Water (EC: 750 – 2250 $\mu\text{S/cm}$): This water cannot be used on soils with restricted drainage.

Even with adequate drainage, special management for salinity control may be required and plants with good salt tolerance should be selected.

Very High Salinity Water (EC: >2250 $\mu\text{S/cm}$): This water is not suitable for irrigation under ordinary condition. The soils must be permeable, drainage must be adequate, irrigation water must be applied in excess to provide considerable leaching and very salt tolerant crops should be selected.

Table 4.6: Classification of Ground water for Irrigation based on EC values

S.No.	EC	shallow aquifer		Deeper Aquifer	
	($\mu\text{S/cm}$)	No. of samples	% of samples	No. of samples	% of samples
1	< 250	0	0.00	0	0
2	>250-750	27	16.07	49	41.18
3	>750-2250	110	65.48	65	54.62
4	2250-3000	14	8.33	5	4.20
5	3000-5000	12	7.14	0	0
6	5000	5	2.98	0	0
Total samples		168	100	119	100

In shallow aquifer, maximum numbers of samples fall under the category of medium to high salinity type of water. In deeper Aquifer, also maximum numbers of samples fall under the category of medium to high salinity type of water. The areas where very high salinity prevails (>2250 $\mu\text{S/cm}$) ground water can be used for irrigation for very high salt tolerant crops and with proper soil and crop management practices

Sodium Absorption Ratio (SAR)

Since Calcium and Magnesium will replace Sodium more readily than vice versa, the ratio reflects the Sodium hazard. The SAR indicates the relative activity of the Sodium ions in exchange reactions with the soil. The main problem with high sodium concentration is its effect on soil permeability; hardening of soil & water irrigation system. Sodium also contributes directly to the total salinity of the water and may be toxic to sensitive crops such as fruit trees. The higher value of SAR indicates soil structure damage. In shallow aquifer, out of 189 samples analyzed and 187 samples are having SAR less than 10 and 2 samples are having SAR value more than 10. In deeper aquifer, out of 119 samples 113 samples are having SAR value less than 10 and only one sample having SAR more than 18. The classification of ground water samples based on SAR values for its suitability for irrigation purpose is shown in **Table 4.7**.

Table 4.7: Classification of Ground water for Irrigation based on SAR values

Characteristics	Quality	SAR value							
		< 10		10-18		18-26		> 26	
	Good	Good to Permissible		Doubtful		Bad (Unsuitable)			
	Total No of GW samples	Samples		Samples		Samples		Samples	
	No	%	No	%	No	%	No	%	
Shallow Aquifer	189	187	98.94	2	1.07	0	0.00	0	0
Deeper Aquifer	119	113	94.96	5	4.42	1	0.88	0	0
Total	308	300	97.40	7	2.33	1	0.33	0	0

Residual Sodium Carbonate (RSC):

Residual Sodium Carbonate (RSC) is considered to be superior to SAR as a measure of sodicity particularly at low salinity levels. Calcium reacts with bi-carbonate and precipitate as CaCO_3 . Magnesium salt is more soluble and so there are fewer tendencies for it to precipitate. When calcium and magnesium are lost from the water, the proportion of sodium is increased resulting in the increase in sodium hazard. This hazard is evaluated in terms of RSC. The classification of ground water samples based on RSC values for its suitability for irrigation purpose is shown in **Table 4.8**.

Table 4.8: Classification of Ground water for Irrigation based on RSC values.

Characteristics	Total No of GW samples	RSC values (meq/L)					
		< 1.25		1.25-2.50		> 2.50	
		Good		Doubtful		Bad (Unsuitable)	
		No. of Samples	%	No. of Samples	%	No. of Samples	%
Shallow Aquifer	189	172	91.01	7	4.07	10	5.81
Deeper Aquifer	119	115	96.64	4	3.48	0	0.00
Total	308	287	93.18	11	3.83	10	3.48

In shallow aquifer, it is observed that out of 189 samples only 17 samples show RSC values more than 1.25 meq/L indicating that the ground water of the area is not suitable for irrigation while in deeper aquifer, out of 119 samples only 4 samples show RSC more than 1.25 meq/L indicating that the ground water of the area is not suitable for irrigation.

5. GROUND WATER RESOURCES

5.1 Ground Water Resources – Aquifer-I

Central Ground Water Board and Ground Water Survey and Development Agency (GSDA) have jointly estimated the ground water resources of Solapur district based on GEC-2015 methodology. Taluka wise ground water resources are given in **Table 5.1**, and graphical representations of the resources on the map are shown in **Figure 5.1**.

Table 5.1: Ground water resources, Aquifer-I (Shallow aquifer), Solapur district (2017)

Sr No.	Assessment Unit Name	Annual Extractable Ground Water Recharge (Ham)	Current Annual Ground Water Extraction (Ham)			Annual GW Allocation for Domestic Use as on 2025 (Ham)	Net Ground Water Availability for future use (Ham) (8=3-6-7)	Stage of Ground Water Extraction (%) (9=(6/3*100))	Categorization (OE/Critical/Semi critical/Safe)
			Irrigation Use	Water Draft for domestic and industrial Use	Total Extraction (6=4+5)				
1	2	3	4	5	6	7	8	9	10
1.	Akkalkot	13385.26	6968.43	499.89	7468.32	580.31	5836.51	55.80	Safe
2.	Barshi	10084.26	7626.75	466.23	8092.98	528.59	1928.93	80.25	Semi Critical
3.	Karmala	11539.84	7947.38	377.97	8325.35	420.55	3305.68	72.14	Semi Critical
4.	Madha	15664.15	12317.21	514.65	12831.87	570.66	3734.85	81.92	Semi Critical
5.	Malshiras	19488.00	19130.17	613.74	19743.91	670.80	1997.01	101.31	Over Exploited
6.	Mangalwedha	8451.62	6455.32	300.93	6756.26	371.21	1629.47	79.94	Semi Critical
7.	Mohol	13370.73	11453.91	480.21	11934.13	540.12	2488.44	89.26	Semi Critical
8.	N.Solapur	6199.19	3991.40	210.91	4202.31	251.02	1969.32	67.79	Safe
9.	Pandharpur	13967.20	10374.51	410.88	10785.40	468.19	3694.62	77.22	Semi Critical
10.	S.Solapur	11070.11	6357.24	365.73	6722.97	457.79	4259.82	60.73	Safe
11.	Sangola	14046.82	10089.50	621.55	10711.05	782.92	3184.44	76.25	Semi Critical
Solapur District		137267.20	102711.83	4862.70	107574.53	5642.17	34029.08	78.37	Semi Critical

Ground Water Resources estimation was carried out for 14838.9 sq. km. area. About 56.1 sq. km. area is hilly not considered for resource estimation. As per the estimation (2017), the net Annual Extractable Ground Water Recharge is 1372.67 MCM. The Annual Ground Water Extraction for all uses is estimated at 1075.75 MCM with irrigation sector being the major consumer having a draft of 1027.12 MCM. The domestic and industrial water usage is estimated to be 48.63 MCM. The net ground water availability for future irrigation is estimated at 395.16 MCM. Stage of ground water development varies from 55.80% (Akkalkot) to 101.31% (Malshiras). The overall stage of ground water development for the district is 78.37%. Taluka wise assessments indicate that seven numbers of the talukas in the district fall under “Semi Critical” category, three Talukas, namely Akkalkot, Solapur North and Solapur South fall under “Safe” category and only one Taluka, Malshiras falls under “Over-exploited” category.

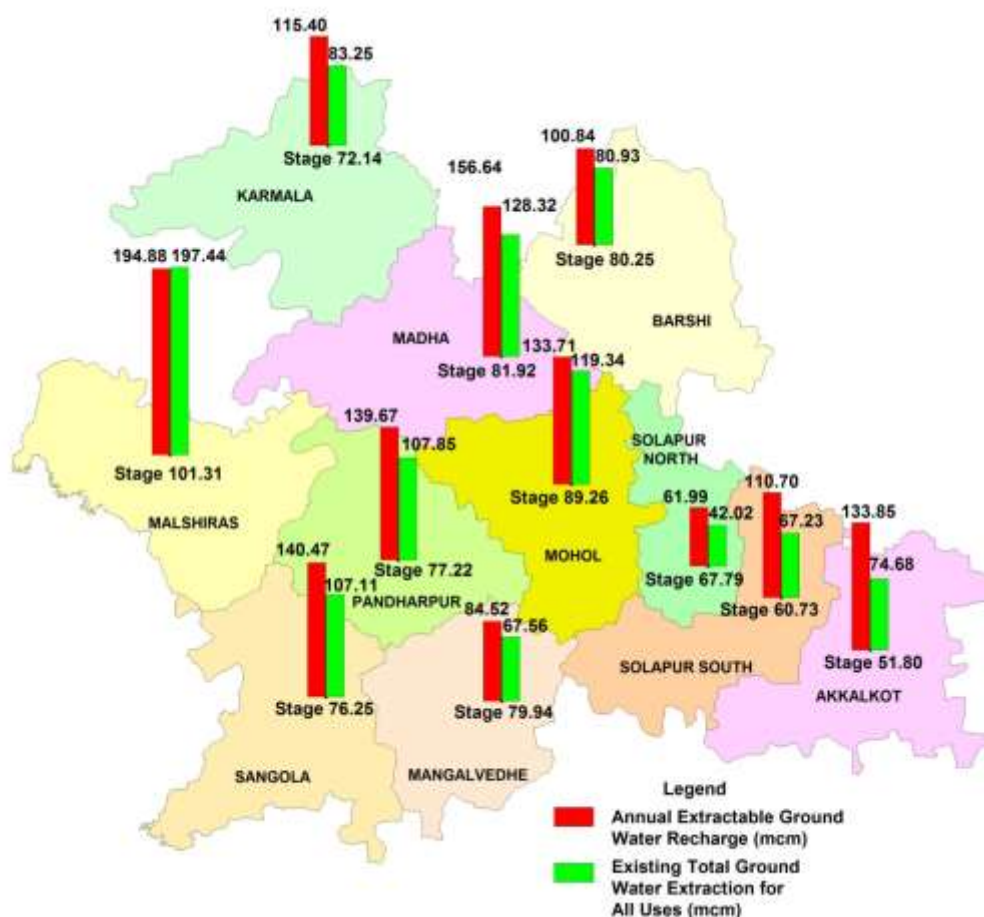


Figure 5.1: Ground Water Resources SOLAPUR district

5.2 Ground Water Resources – Aquifer-II

The ground water resources of Aquifer-II (Basalt) was also assessed to have the correct quantification of resources so that proper management strategy can be framed. The total resources of aquifer-II have been estimated as 348.20 MCM. Taluka wise summarized Ground Water Resources of Aquifer-II is given in **table 5.2**.

Table 5.2: Taluka wise summarized Ground Water Resources of Aquifer-II (Deeper aquifer)

Taluka	Area (Sq. Km.)	Mean thickness (m)	Piezometric head (m) (Above bottom of confining layer)	Sy	S	Resource above confining layer (mcm)	Resource in confining aquifer (mcm)	Total Resource (mcm)
Akkalkot	600.211	1.25	55	0.005	0.000057	3.75132	1.88166	5.633
Akkalkot	341.742	3	65	0.005	0.000057	5.12613	1.26615	6.3923
Akkalkot	185.295	5	70	0.005	0.000057	4.63238	0.73933	5.3717
Akkalkot	154.939	7	90	0.005	0.000057	5.42287	0.79484	6.2177
Akkalkot	125.346	9	60	0.005	0.000057	5.64057	0.42868	6.0693
Barshi	706.404	1.25	70	0.003	0.000012	2.64902	0.59338	3.2424
Barshi	558.61	3	55	0.0025	0.000012	4.18958	0.36868	4.5583
Barshi	230.358	5	90	0.003	0.000012	3.45537	0.24879	3.7042
Karmala	542.063	1.25	65	0.0025	0.0000145	1.69395	0.51089	2.2048
Karmala	882.606	3	70	0.002	0.0000145	5.29564	0.89585	6.1915
Karmala	232.713	5	60	0.0025	0.0000145	2.90891	0.20246	3.1114
Madha	66.0907	1.25	55	0.002	0.0000145	0.16523	0.05271	0.2179
Madha	1402.93	3	65	0.002	0.0000145	8.41758	1.32226	9.7398
Madha	79.7695	5	90	0.002	0.0000145	0.7977	0.1041	0.9018
Madha	11.1013	7	60	0.002	0.0000145	0.15542	0.00966	0.1651
Malshiras	189.674	1.25	70	0.005	0.000057	1.18546	0.7568	1.9423
Malshiras	465.3	3	55	0.005	0.000057	6.9795	1.45872	8.4382
Malshiras	150.9551	5	65	0.005	0.000057	3.77388	5.59289	9.3668
Malshiras	95.6643	7	60	0.005	0.000057	3.34825	3.27172	6.62
Malshiras	65.9971	9	70	0.005	0.000057	2.96987	2.63328	5.6032
Malshiras	524.5815	11	90	0.005	0.000057	28.85198	26.91103	55.763
Mangalvedhe	205.741	1.25	90	0.003	0.000057	0.77153	10.55451	11.326
Mangalvedhe	209.734	3	55	0.003	0.000012	1.88761	0.13842	2.026
Mangalvedhe	365.161	5	60	0.003	0.000012	5.47742	2.62916	8.1066
Mangalvedhe	272.445	7	65	0.003	0.000057	5.72135	10.09409	15.8154
Mangalvedhe	82.8859	9	70	0.003	0.000057	2.23792	3.30715	5.5451
Mohol	288.424	1.25	90	0.005	0.000012	1.80265	3.11498	4.9176
Mohol	786.944	3	55	0.005	0.000057	11.80416	2.46707	14.2712
Mohol	285.535	5	60	0.005	0.000057	7.13838	9.7653	16.9037
Pandharpur	129.932	1.25	65	0.005	0.0000145	0.81208	0.12246	0.9345
Pandharpur	35.643	3	70	0.005	0.000012	0.53465	0.02994	0.5646
Pandharpur	370.488	5	90	0.005	0.000012	9.2622	0.40013	9.6623
Pandharpur	4.862	7	60	0.005	0.0000145	0.17017	0.00423	0.1744
Pandharpur	749.191	9	55	0.005	0.000012	33.7136	0.49447	34.2081
Sangola	242.997	1.25	90	0.005	0.0000145	1.51873	0.31711	1.8358
Sangola	509.512	3	65	0.005	0.0000145	7.64268	0.48022	8.1229
Sangola	508.734	5	55	0.005	0.0000145	12.71835	0.40572	13.1241
Sangola	232.652	7	60	0.005	0.0000145	8.14282	0.20241	8.3452
Sangola	271.7293	9	70	0.005	0.0000145	12.22782	0.27581	12.5036
Solapur North	200.179	1.25	70	0.0025	0.000012	0.62556	0.16815	0.7937
Solapur North	156.255	3	70	0.0025	0.000012	1.17191	0.13125	1.3032
Solapur North	71.2434	5	55	0.0025	0.0000145	0.89054	0.05682	0.9474
Solapur North	46.1043	7	65	0.0025	0.0000145	0.80683	0.04345	0.8503
Solapur North	38.017	9	90	0.0025	0.000012	0.85538	0.04106	0.8964
Solapur North	78.0998	11	60	0.0025	0.0000145	2.14774	0.06795	2.2157

Taluka	Area (Sq. Km.)	Mean thickness (m)	Piezometric head (m) (Above bottom of confining layer)	Sy	S	Resource above confining layer (mcm)	Resource in confining aquifer (mcm)	Total Resource (mcm)
Solapur South	227.231	1.25	70	0.005	0.0000145	1.42019	0.23064	1.6508
Solapur South	632.191	3	90	0.005	0.0000145	9.48287	0.82501	10.3079
Solapur South	86.8731	5	55	0.005	0.0000145	2.17183	0.06928	2.2411
Solapur South	13.1957	7	60	0.005	0.0000145	0.46185	0.01148	0.4733
Solapur South	27.3479	9	65	0.005	0.000012	1.23066	0.02133	1.252
Solapur South	97.3869	11	55	0.005	0.0000145	5.35628	0.07767	5.4339
Total	14839.08					96.5911	251.6163	348.2074

6. GROUND WATER RELATED ISSUES

6.1 Declining Water Levels

The ground water exploitation has resulted in decline of water levels over the period of time. In premonsoon season, declining water level trend has been observed in about 10191sq km area during 2008-17, i.e., 68.4% of the geographical area. Significant decline more than 0.20 m/year has been observed in 876 sq km, i.e., 5.8 % area covering major part of Karmala, Madha and Mohol talukas. In post monsoon season, fall in water level trend has been observed in the major parts of the district. Significant decline more than 0.20 m/year has been observed in 439 sq km area.

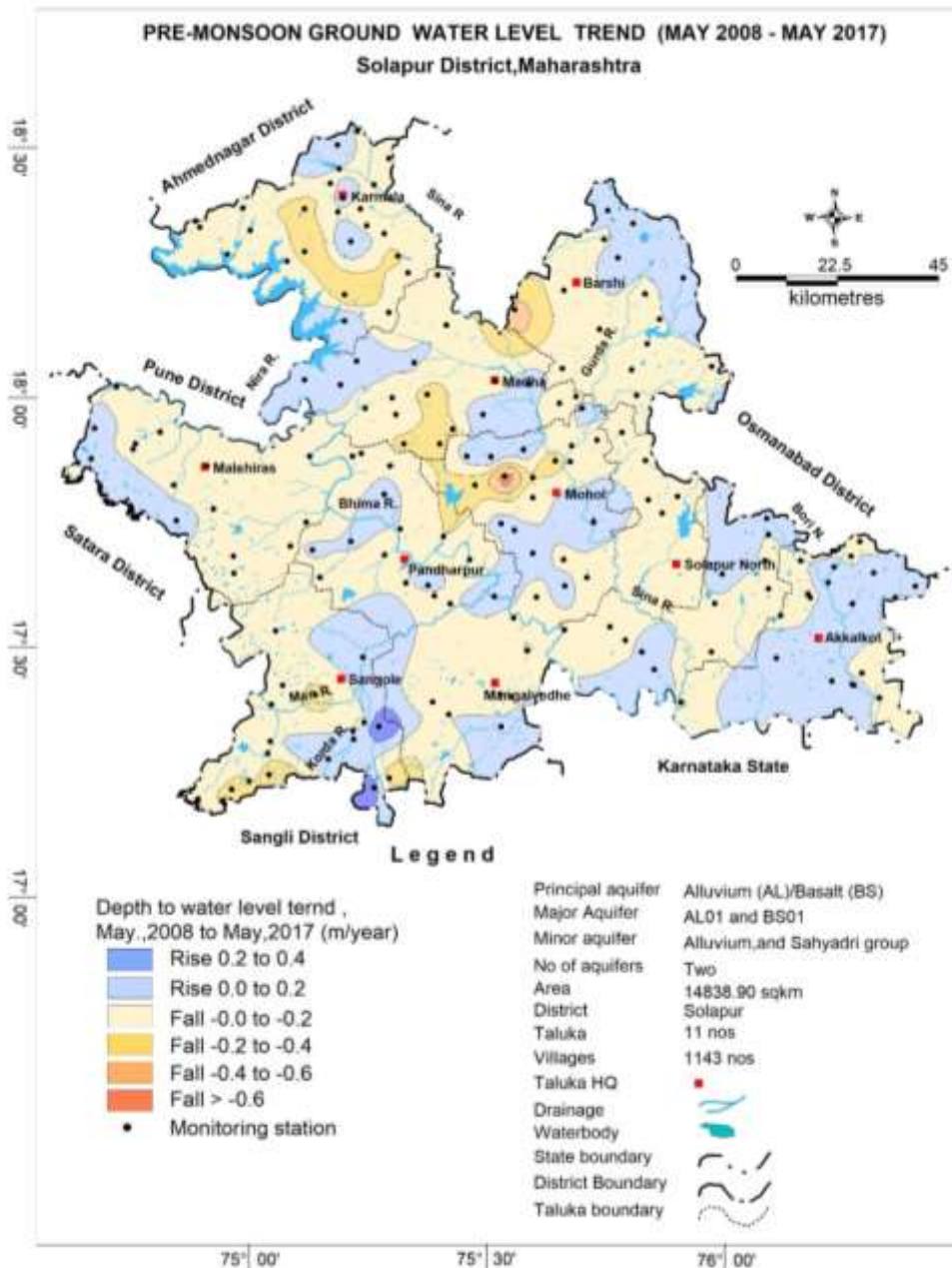


Figure 6.1: Premonsoon water level trend

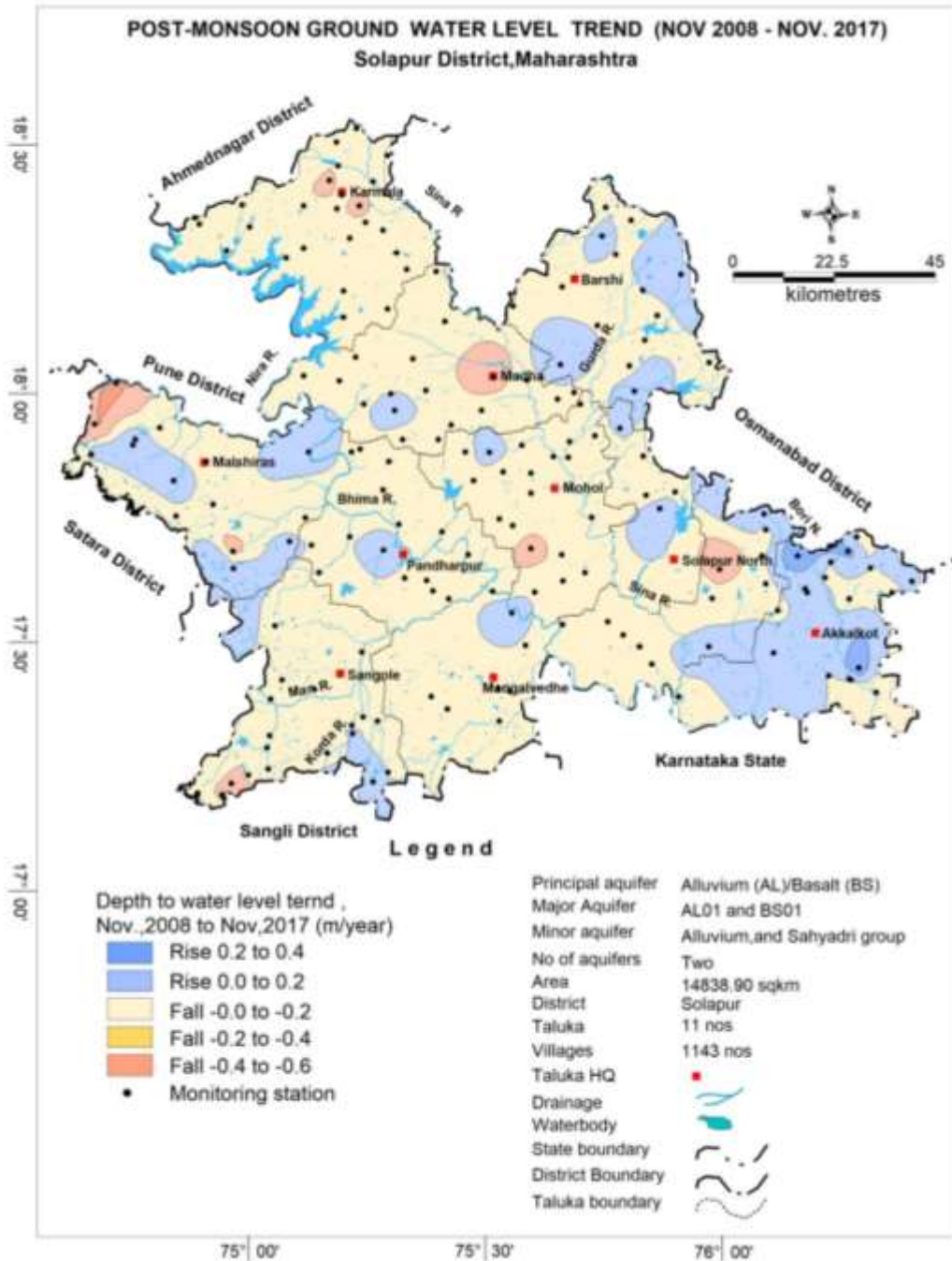


Figure 6.2: Postmonsoon water level trend

6.2 Low Rainfall, Vagaries of Monsoon and Droughts

The entire district comes under the rain shadow area. Rainfall is uncertain and scanty. The average rainfall for the district is 541 mms and classified as Drought Prone areas Based on the rainfall trend analysis from 2006 to 2017 it is observed that all except 3 talukas of Solapur district experience low and declining rainfall trend (Figure 6.3.1 to Figure 6.3.6).

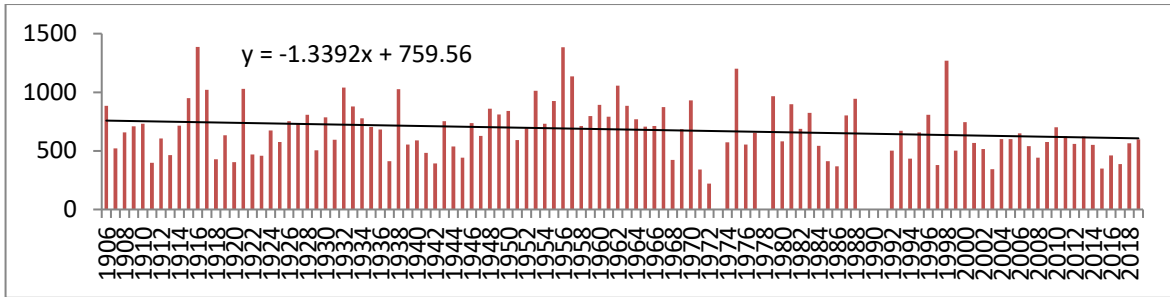


Figure 6.3.1: Rainfall Trend (1906-2019), Akkalkot taluka

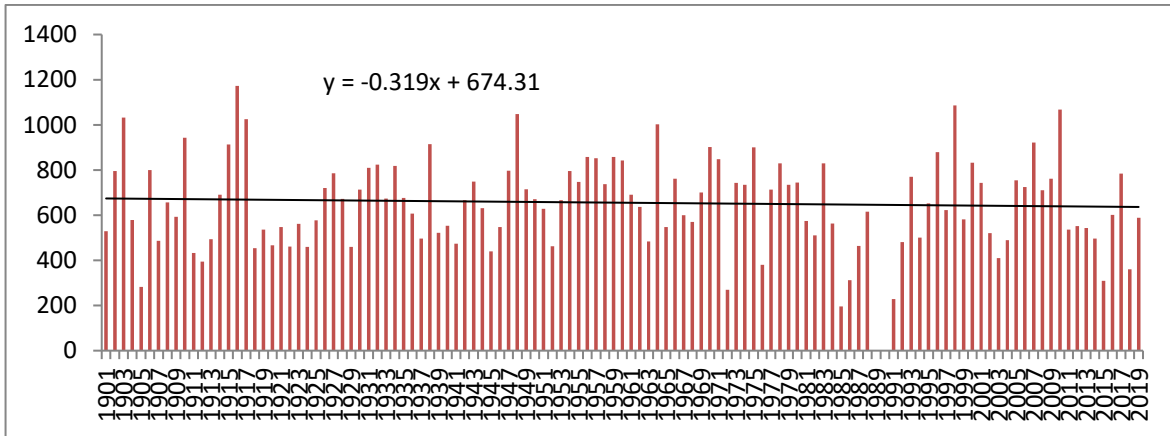


Figure 6.3.2: Rainfall Trend (1901-2019), Barshi taluka

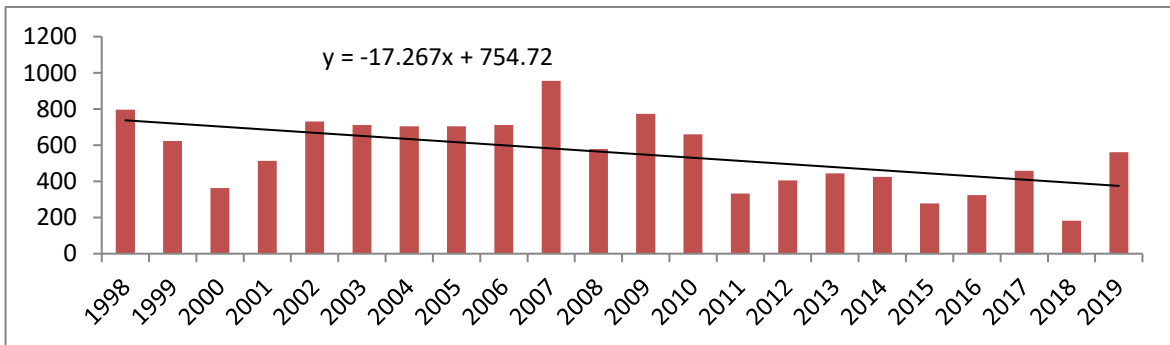


Figure 6.3.3: Rainfall Trend (1998-2019), Mangalvedhe taluka

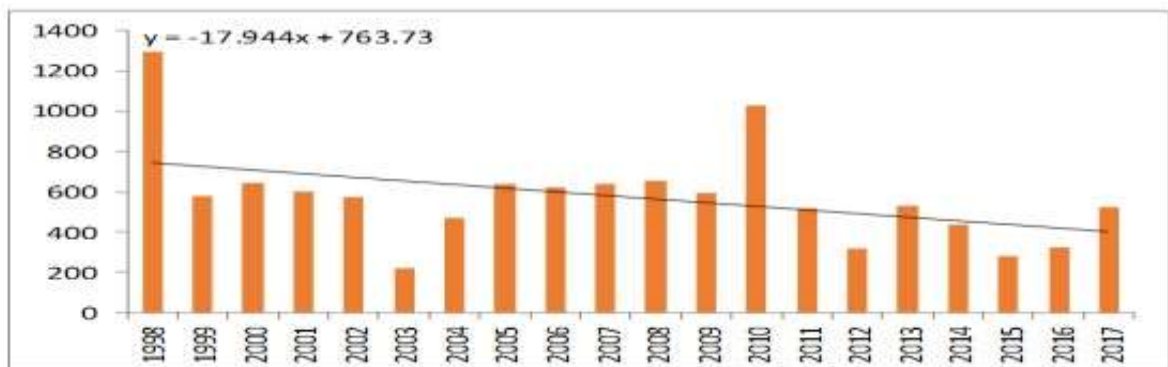


Figure 6.3.4: Rainfall Trend (1998-2017), Mohol taluka

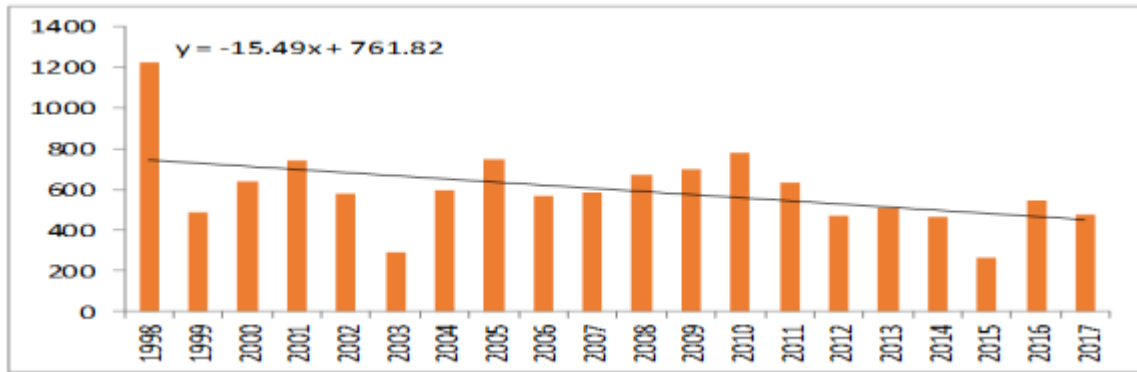


Figure 6.3.5: Rainfall Trend (1998-2017), South Solapur taluka

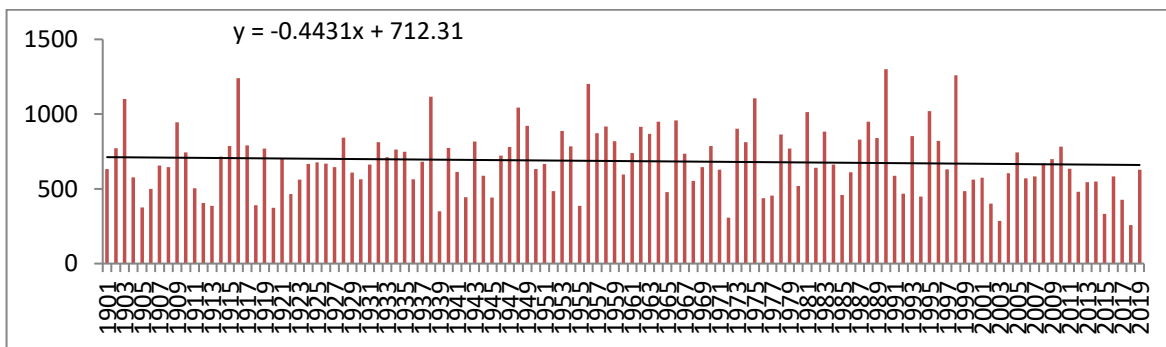


Figure 6.3.6: Rainfall Trend (1901-2019), North Solapur taluka

6.3 Low Ground Water Storage Potential

Low ground water potential areas have been identified in 7878 sq km (about 52.9 %) in the Solapur District, where yield remains less than 25 m³/day, mostly due to limited depth of weathering and fractures in Aquifer-I (Basalt).

Limited aquifer potential of Aquifer-II (Basalt) is seen in about 13191 sq km (about 88 %) of the Solapur district, having yield potential less than 1.0 lps. Sustainability of both the aquifers is limited and the wells normally sustain pumping of 0.5 to 3 hours.

6.4 Problems faced during drilling of Borewells:

Red boles, black boles, the inter-trappean beds, have collapsible nature when they are saturated. The weathered/highly fractured saturated formation at the contact zones also collapse as a result of which drill rods assembly gets stuck up. This sometimes leads to loss of circulation of fluid there by compounding the problems further. The thickness ranging from 8 to 10 m. The water bearing zones encountered fills up the bore well and that infuses the bole beds in the succession resulting in the collapse of the bole beds. The casing or cement sealing of the red bole is not possible below 100 m bgl, as the present rig is equipped to lower casing down to 100 m bgl depth.

Loss of air in jointed and fractured Basalt was observed during drilling. The problem can be solved by sealing the zones by lowering casing or by cement sealing. This process may often damage the potential aquifer zones if not carried out meticulously with proper equipment.

6.5 Continuous Increase in Ground Water Extraction and Increase in Stage of Ground Water Extraction

The stage of ground water development has increased over the period of time from 1998 to 2017 from 37.52% in 1998 to 75.49% in 2013 and to 78.37% in 2017 as per 2017 resource estimation. The main reason for ground water overdraft is intensive irrigation for cash crop. Overall draft for these talukas has increased from 604.14 MCM in 1998 to 1195.52 MCM in 2013. Ground Water Resources Estimation carried out in 2017, Annual Extractable Ground Water Recharge was estimated as 1372.67 MCM as per the new methodology and Annual Ground Water Extraction was estimated as 1075.74 MCM.

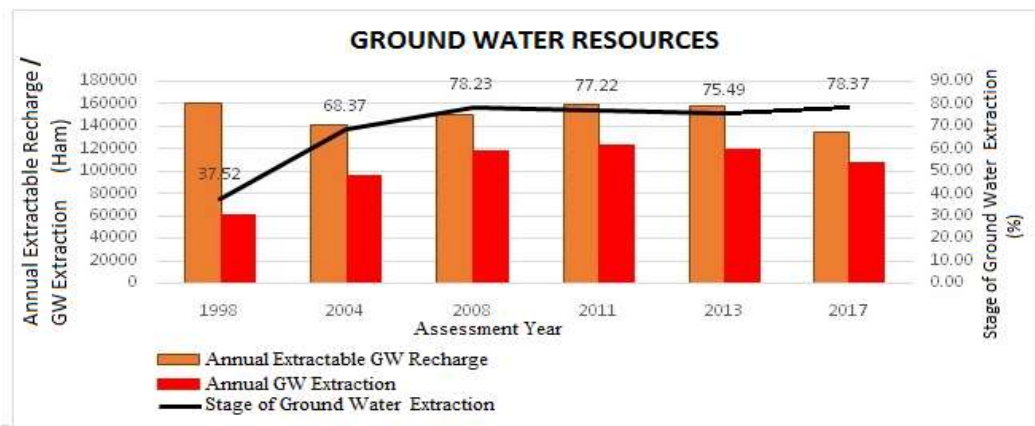


Figure 6.4: Changes in Ground Water Extraction and Increase in Stage of Ground Water Extraction in Solapur District

7. MANAGEMENT PLAN

The management plan has been proposed to manage the ground water resources and to arrest further decline in water levels. The management plan comprises two components namely supply-side management and demand side management. The supply side Management is proposed based on surplus surface water availability and the unsaturated thickness of aquifer whereas the demand side management is proposed by use of micro irrigation techniques and change in cropping pattern.

7.1 Supply Side Management

The supply side management of ground water resources can be done through the artificial recharge of surplus runoff available within river sub basins and micro watersheds. Also, it is necessary to understand the unsaturated aquifer volume available for recharge. The unsaturated volume of aquifer was computed based on the area feasible for recharge, unsaturated depth below 5mbgl and the specific yield of the aquifer. **Table 7.1** gives the district wise volume available for the recharge.

Table 7.1: Area feasible and volume available for Artificial Recharge

Taluka	Geographical Area (sq. km)	Area feasible for recharge (sq.km)	Unsaturated Volume (MCM)
Akkalkot	1407.05	1142.73	2285.46
Barshi	1509.94	1481.68	2963.36
Karmala	1659.83	1229.39	2458.78
Madha	1559.33	1484.36	2968.72
Malshiras	1528.01	498.16	996.32
Mangalwedha	1135.10	1162.88	2325.76
Mohol	1360.46	1228.42	2456.84
N.Solapur	589.27	523.43	1046.86
Pandharpur	1290.10	1052.92	2105.84
S.Solapur	1084.15	963.37	1926.73
Sangola	1771.76	950.44	1900.88
Total	14895.00	11717.78	23435.55

The total unsaturated volume available for artificial recharge is 23435.55 MCM and it ranges from 996 MCM in Malshiras taluka to 2968 MCM in Madha taluka. The available surplus runoff can be utilized for artificial recharge through construction of percolation tanks and Check dams at suitable structures. The number of recharge percolation tanks, and check dams are decided based on the depth to water level and drainage available in the district.

Thus, after taking into consideration all the factors, only 268.93 MCM of surplus water can be utilised for recharge, which is given in table 10.2. This surplus water can be utilized for constructing 2690 check dams and 940 percolation tanks and at suitable sites. The number of feasible artificial recharge structures was calculated by considering 0.20 MCM per percolation tanks and 0.03 MCM per check dam. This intervention should lead to recharge @ 75% efficiency of about 201.7 MCM/year. Tentative locations of these structures are given in Figure 7.2 and details also given in Annexure-VI(A) and VI(B).

Table 7.2: Proposed Recharge Structures

Taluka	Geographical Area (sq.km)	Area feasible for recharge (sq. km.)	Unsaturated Volume (MCM)	Surplus water available for AR (MCM)	Proposed number of structures		Total Volume of Water expected to be recharged@ 75 % efficiency (MCM)		Total recharged @ 75 % efficiency (MCM)
					PT	CD	PT	CD	
Akkalkot	1407.05	1142.73	2295.19	28.11	98	281	14.74	6.34	21.08
Barshi	1509.94	1481.68	2963.36	36.3	127	363	19.05	8.18	27.23
Karmala	1659.83	1229.39	2458.78	30.12	105	301	15.79	6.8	22.59
Madha	1559.33	1484.36	2968.72	36.36	127	364	19.08	8.19	27.27
Malshiras	1528.01	498.16	996.32	12.2	43	122	6.43	2.72	9.15
Mangalwedha	1135.1	1162.88	2325.76	28.49	100	285	14.96	6.41	21.37
Mohol	1360.46	1228.42	2456.84	24.5	86	245	12.87	5.51	18.38
Pandharpur	1290.1	1052.92	2105.84	22.05	77	221	11.57	4.97	16.54
Sangola	1771.76	950.44	1900.88	23.28	81	233	12.17	5.29	17.46
N.Solapur	589.27	523.43	1046.86	12.82	45	128	6.75	2.87	9.62
S.Solapur	1084.15	963.37	1926.73	14.7	51	147	7.67	3.36	11.03
Total	14895	11717.78	23445.28	268.93	940	2690	141.08	60.64	201.72

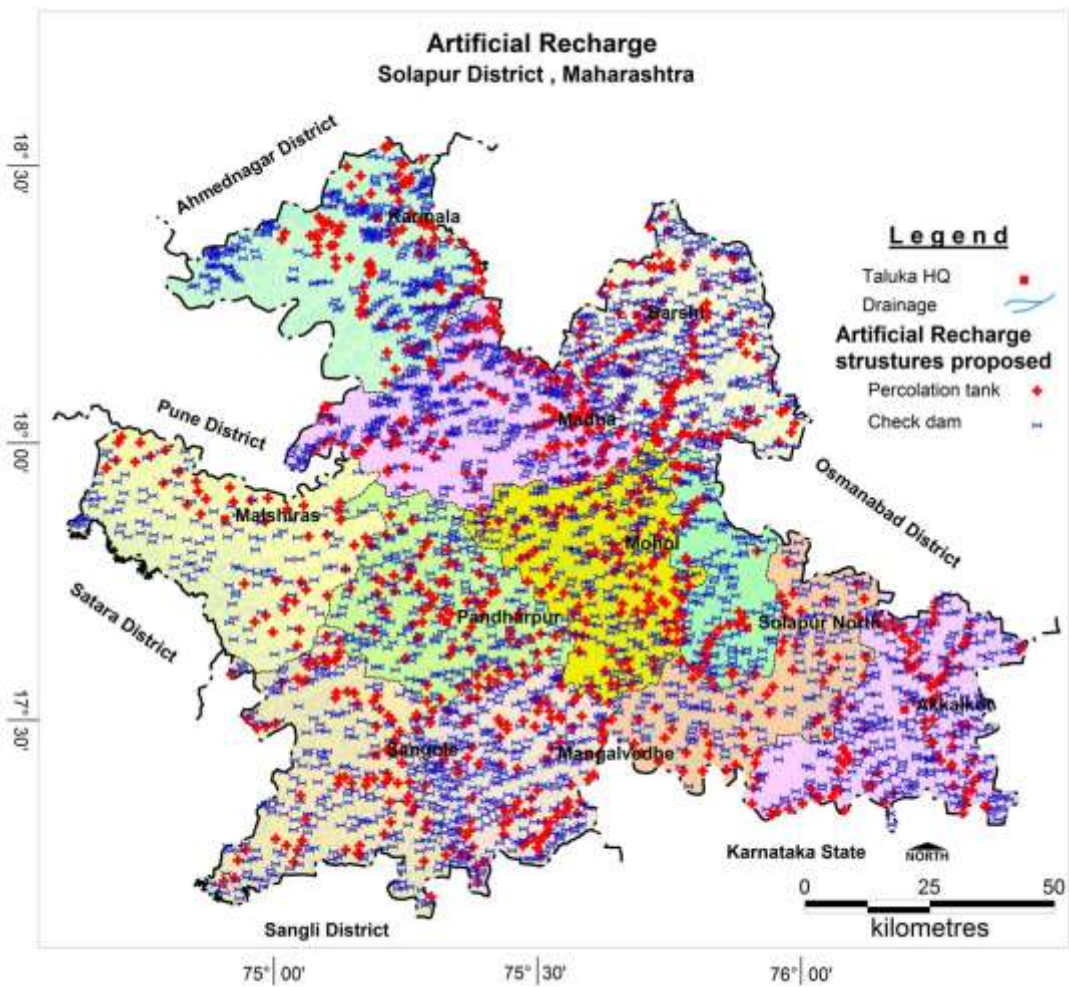


Figure 7.1: Proposed Artificial Recharge structures

Also, roof-top rainwater harvesting can be adopted in 25% of the households in urban areas and 10% of the households in rural areas with 50 Sq. m roof area. This technique is recommended and may be implemented if economically viable.

7.2 Demand Side Management

Demand side interventions such as change in cropping pattern has not been proposed in the area as cash crop cultivation drives the economy of the region. However, there is a scope for increasing areas under micro-irrigation techniques like drip irrigation (about 334 sq km area of sugarcane and 10.3 sq. km. area of onion crop, which is under groundwater irrigation is proposed to be covered under Drip). Volume of Water expected to be saved is estimated as 190.38 MCM in sugarcane crop (Sugarcane Surface Flooding irrigation req.- 2.45 m. Drip Req. - 1.88, WUE- 0.57 m) and 2.678 MCM in Onion crop (Onion requirement - 0.78 m, Drip - 0.52 m, WUE- 0.526 m) . Total water saved by implementing Drip irrigation would be 193.06 MCM.

Table 7.3: Area Proposed for Drip Irrigation Demand Side Management

Taluka	Geographical Area (sq.km)	Sugarcane crop -ground water irrigated area proposed to be covered under Drip (sq.km.)	Volume of Water expected to be saved (MCM). Sugarcane water req- 2.45 m. Drip Req. - 1.88, WUE- 0.57 m	Onion crop -ground water irrigated area proposed to be covered under Drip (sq.km.)	Volume of Water expected to be conserved (MCM). Onion requirement - 0.78 m, Drip - 0.52 m, WUE- 0.26 m	Total water saved
Akkalkot	1401.3	50	28.5	2	0.52	29.02
Barshi	1522.5	50	28.5	5	1.3	29.8
Karmala	1659.83	2	1.14	0	0	1.14
Madha	1559.33	2	1.14	0	0	1.14
Malshiras	1528.01	103	58.71	0	0	58.71
Mangalvedhe	1141.59	50	28.5	0.3	0.078	28.58
Mohol	1360.46	17	9.69	0	0	9.69
Pandharpur	1290.1	2	1.14	0	0	1.14
Sangola	1514.31	35	19.95	0	0	19.95
Solapur North	683.03	20	11.4	3	0.78	12.18
Solapur South	1084.15	3	1.71	0	0	1.71
Total	14744.61	334	190.38	10.3	2.678	193.06

7.3 Expected Benefits

The impact of groundwater management plans on the groundwater system in the district after its implementation is evaluated and the outcome shows significant improvement in groundwater scenario in all Talukas as given in the Tables 7.3 & 7.4.

The micro-irrigation techniques are proposed in Sugarcane crop growing area of 334.0 Sq. Km & Onion 10.0 Sq.KM can save a total of 193.06 MCM of GW.

Table 7.3: Expected benefits after management interventions

Taluka	Annual Extractable Ground Water Recharge (MCM)	Current Annual Ground Water Extraction (MCM)	Water Recharged by Supply side intervention (MCM)	Water saving by demand side intervention (MCM)	Present Stage of Ground Water Extraction (%)	Ground water resources after supply side management (MCM)	Ground water Draft after demand side management (MCM)	Expected Stage of Ground Water Extraction after Supply and Demand side interventions (%)
Akkalkot	133.85	74.68	21.08	29.02	55.79	154.94	45.66	29.47
Barshi	100.84	80.93	27.23	29.8	80.25	128.07	51.13	39.92
Karmala	115.4	83.25	22.59	1.14	72.14	137.99	82.11	59.51
Madha	156.64	128.32	27.27	1.14	81.92	183.91	127.18	69.15
Malshiras	194.88	197.44	9.15	58.71	101.31	204.03	138.73	67.99
Mangalvedhe	84.52	67.56	21.37	28.58	79.94	105.88	38.98	36.82
Mohol	133.71	119.34	18.38	9.69	89.25	152.08	109.65	72.1
Pandharpur	139.67	107.85	16.54	1.14	77.22	156.21	106.71	68.31
Sangole	140.47	107.11	11.03	1.71	76.25	151.49	87.16	55.19
Solapur North	61.99	42.02	17.46	19.95	67.78	79.45	29.84	41.68
Solapur South	110.7	67.23	9.62	12.18	60.73	120.32	65.52	53.83
Total	1372.67	1075.73	201.7	193.06	78.37	1574.37	882.69	56.06

7.4 Development Plan

The ground water development plan is recommended to bring the stage of ground water extraction upto 70%. Balance ground water resources available for ground water development after the stage of Ground Water Extraction is brought up to 70% after implementing above measures is 279.81 MCM. The development plan is proposed to bring stage of ground water development up to 70% and details are given in table 10.4 and Figure 7.3.

Table 7.4: Development plan

Taluka	Annual Extractable Ground Water Recharge (MCM)	Ground water resources after supply side management (MCM)	Ground water Draft after demand side management (MCM)	Expected Stage of Ground Water Extraction after Supply and Demand side interventions (%)	Balance GWR available (after implementing supply - side/ demand-side interventions) for further Development to achieve 70% Stage of Ground Water Extraction (MCM)	Proposed No. of DW @ 1.5 ham for 90% of GWR Available	Proposed No. of BW @1.5 ham for 10% of GWR Available	Additional Area (sq.km.) proposed to be brought under assured Ground Water irrigation with av. CWR of 0.65 m with 70% Stage of GW Extraction
Akkalkot	133.85	154.94	45.66	29.47	62.79	3767	419	96.6
Barshi	100.84	128.07	51.13	39.92	38.52	2311	257	59.26
Karmala	115.4	137.99	82.11	59.51	14.48	869	97	22.27
Madha	156.64	183.91	127.18	69.15	1.56	94	10	2.4
Malshiras	194.88	204.03	138.73	67.99	4.09	246	27	6.3
Mangalvedhe	84.52	105.88	38.98	36.82	35.13	2108	234	54.05
Mohol	133.71	152.08	109.65	72.1	0	0	0	0
Pandharpur	61.99	156.21	106.71	68.31	2.63	158	18	4.05
Sangola	110.7	151.49	87.16	55.19	23.39	1403	156	35.98
N Solapur	140.47	79.45	29.84	41.68	20.28	1217	135	31.2
S.Solapur	139.67	120.32	65.52	53.83	19.69	1181	131	30.29
Total	1372.67	1574.37	882.69	56.06	219.37	16791	1462	337.49

The Balance ground water resources available after implementing supply - side/ demand-side interventions, recommended to be utilised for further Development to achieve 70% Stage of Ground Water Extraction, is estimated to be 219.37 MCM. This would bring 337.49 sq km additional area under assured ground water irrigation with average crop water requirement of 0.65 m by constructing 16791 Dug wells and 1462 Bore wells in phased manner for 6 years.

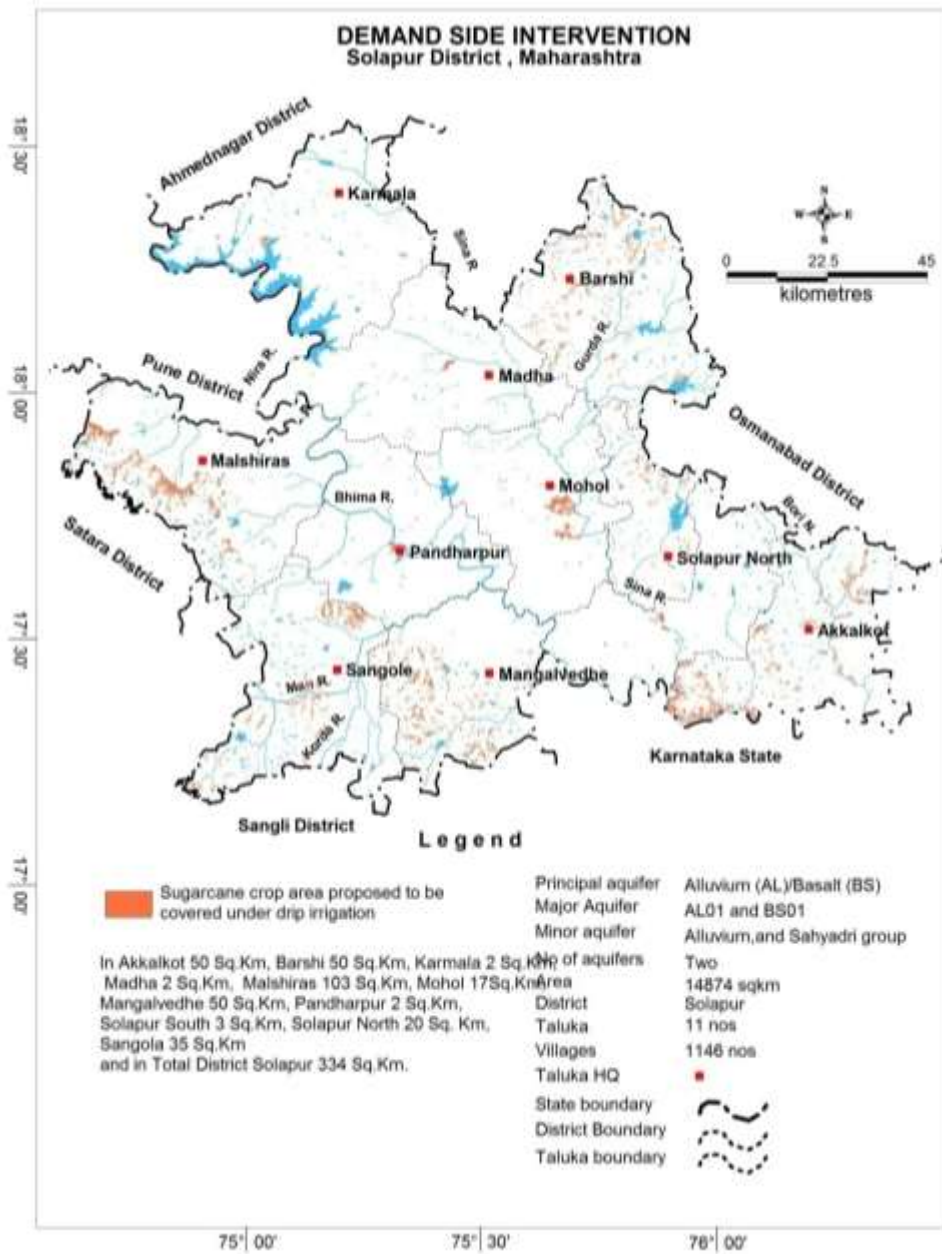


Figure 7.2: Demand side intervention.

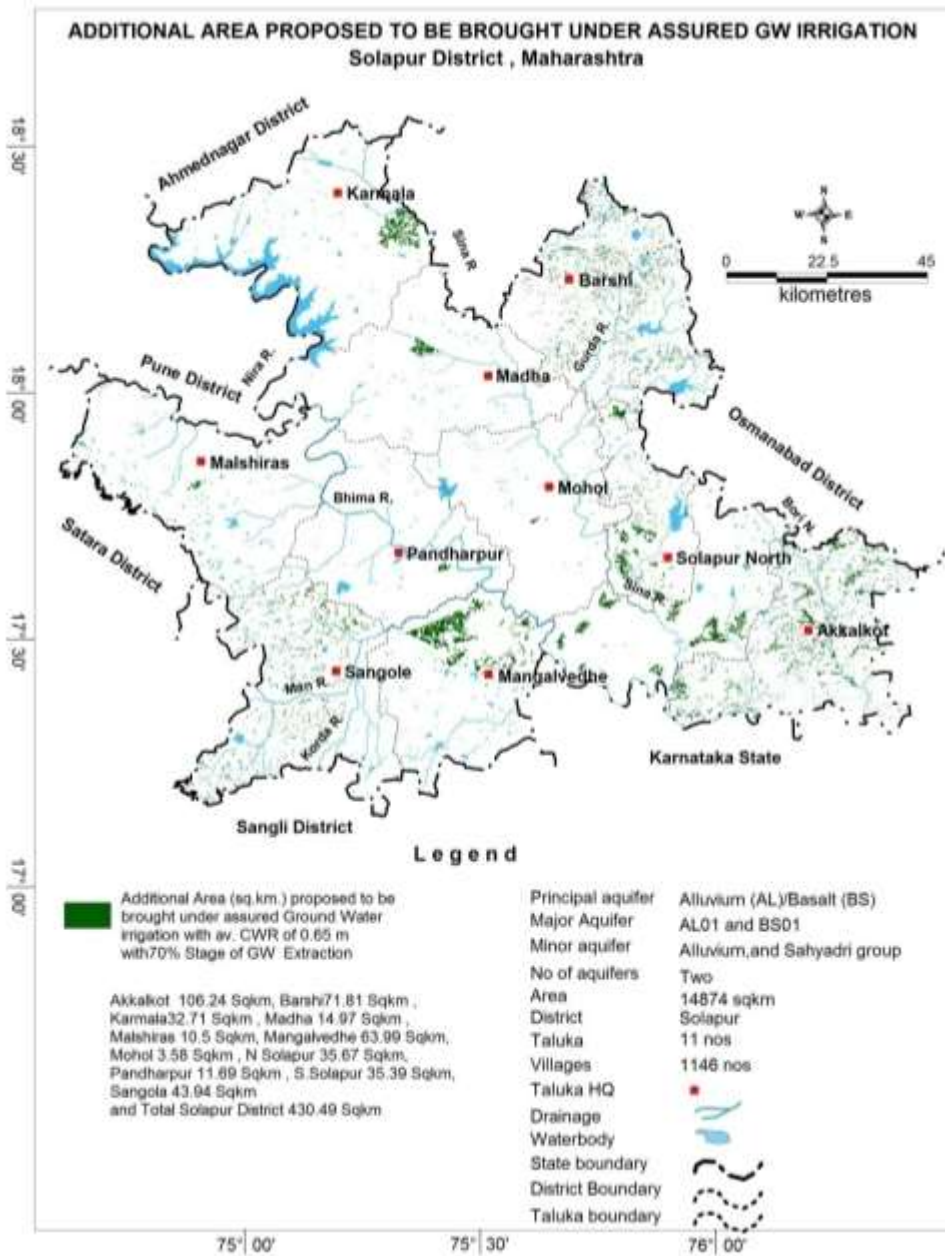


Figure 7.3: Additional area under Assured Ground Water irrigation.

8. SUM UP

A thorough study was carried out based on data gap analysis, data generated in-house, data acquired from State Govt. departments and GIS maps prepared for various themes. All the available data was brought on GIS platform and an integrated approach was adopted for the preparation of taluka wise aquifer maps and aquifer management plans of Solapur district.

Solapur district is one of the five districts of Pune division of Maharashtra State that form the region of Western Maharashtra, with a geographical area of 14895 sq. km. The district headquarters is located at Solapur Town. For administrative convenience, the district is divided into 11 talukas viz., Solapur North, Malshiras, Pandharpur, Barshi, Madha, Sangole, Akkalkot, Mohol, Solapur South, Karmala and Mangalvedhe. It has a total population of 4,317,756 as per 2011 census. The district has 11 towns/talukas and 1167 villages. A major part of the district comes under Bhima and Sina basin.

Physiographically the district shows a hilly and undulating terrain, with altitude ranging between 420 and 720 m above MSL.

Solapur district falls under the rain shadow area. Rainfall is less than 500 mm in the west and increases to the east to about 850 mm. Rainfall is uncertain and scanty. The average rainfall for the district is 488.8 mm. The district is classified as Drought Prone area. Based on the rainfall trend analysis, it is observed that all except 3 talukas of Solapur district experience low and declining rainfall trend.

Deccan Trap Basalt of upper Cretaceous to Lower Eocene age is the major rock formation in the district. Only a very narrow belt confined to the banks of rivers is underlain by Recent Alluvium. Alluvium and Basalt form main aquifers in the district. Two aquifer Systems in Basalt and one shallow aquifer in Alluvium (limited to riverbanks) are found to be prevailing in the district. Deccan basalts are hydrogeologically inhomogeneous rocks. The weathered and jointed /fractured parts of the rock, as also permeable inter-flow beds constitute the zone of ground water storage and flow.

2 Major Aquifer Systems have been deciphered based on 323 DW and 98 bore wells. The shallow Aquifer-I ranges in depth from 8 to 30 m.bgl (Weathered /Jointed/ Fractured Basalt) and the deeper Aquifer –II ranges in depth from 60 to 196 m.bgl (Jointed/fractured basalt).

The water table varies from 420 m amsl in southeastern part of the area to about 560 m amsl in northwestern part of Solapur district. Ground water flow direction is controlled by basin divide of Krishna (Sina/Bhima sub basin) river basin. In general, the ground water movement is towards the Bhima, Sina, Gorda and Nira rivers. It has been observed that the ground water flow direction follows the topography of the area and is towards the major drainage.

The specific capacity of the wells tapping Deccan Trap Basalt ranges between 1.6 and 5 lps/m of draw down and the transmissivity ranges from 1.25 to 207 m²/day. The specific capacity of dug wells tested in alluvial aquifer ranges between 1.1 and 10 lps/m of drawdown. During the pumping tests conducted on the exploratory wells in Alluvium, the transmissivity was found to vary from 30 to as high as 210 m²/day. The storage coefficient varied between 3×10^{-6} and 1.7×10^{-3} . In Deeper Aquifer-II (Jointed/Fractured

Basalt), yield is low (less than 2.5 lps), the transmissivity varies from 18 to 89 m²/day. The storage coefficient varied between 0.00034 and 6.37 x10⁻⁴.

The depth to water levels in Solapur district during May 2017 ranges between 4.1 mbgl (Khatgaon, Karmala taluka) and 23.5 mbgl (Maslechaudhary, Mohol taluka and Tanali, Pandharpur). The depth to water levels of less than 5 mbgl is represented as localized. The depth to water level between 5 and 10 mbgl is observed in most part of the district and covers about 50% of the area. The depth to water levels between 10 and 20 mbgl is observed in central part and east west elongated patch covering parts of Madha, Mohol, Pandharpur, North Solapur and South Solapur talukas. The depth to Water levels from 10-20 mbgl is also observed as small pockets in Karmal, Malshiras, Sangola, Mangalwedha and Barshi talukas. This zone covers about 35% of the district area. The depth to Water levels more than 20 mbgl is observed in small pockets around in central part of the district. The depth to water levels in Solapur district during Nov. 2017 ranges between 0.5 (Kuslamb, Barshi taluka and Kavitgaon, Karmala taluka) and 18.5 mbgl (Takali Shikandar, Mohol taluka). Shallow water levels within 2 m bgl are observed in north east part of Barshi, central and north east part of Sangola and small patches observed in Mangalwedha, Madha, Mohol and Karmala talukas. The depth to water levels between 2-5 mbgl is observed in major parts of the district covering Akkalkot, Mangalwedha, Madha, Mohol, karmala, Pandharpur, Barshi and malshiras talukas. The depth to water levels between 5-10 mbgl is observed in most of the north Solapur, south Solpaur, north west of Malshiras talukas and elongate patches in parts of Pandharpur, Madha, Sangola, Mohol, Karmala and north of Akkalkot talukas. The depth to water levels above 10 mbgl is observed in small patches of north Solpaur, south Solpaur, Pandharpur, Madha and Karmala talukas.

From the Pre-monsoon Water Level Trend (2008-2017) map prepared, declining trend of groundwater level is observed in about 10191sq km area (68.4%). Significant decline more than 0.20 m/year observed in 876 sq. km, (5.8 %) area covering major part of Karmala, Madha and Mohol talukas.

From the Post monsoon Water Level Trend (2008-2017) map prepared, declining trend of groundwater level is observed in the major parts of the district. Significant decline more than 0.20 m/year has been observed in 439 sq. km area (2.94%).

Sustainability of both the aquifers is limited and the wells normally sustain pumping of 0.5 to 3 hours. Aquifer-I, the shallow unconfined aquifer has limited weathering, limited fractures and limited GW potential (70% area with Yield less than 25 m³/day). Aquifer – II, the deeper semi-confined/confined aquifer has limited fractures and limited GW potential (85% area with Yield less than 1.25 lps) and is less sustainable.

The Ground Water Resources Estimation for Solapur district, as per Ground Water Resource Estimation (2017), was carried out for 14838.9 sq. km. area. About 56.1 sq. km area is hilly and not considered for resource estimation. As per the estimation (2017), the net Annual Extractable Ground Water Recharge is 1372.67 MCM. The Annual Ground Water Extraction for all uses is estimated at 1075.75 MCM with irrigation sector being the major consumer having a draft of 1027.12 MCM. The domestic and industrial water usage is estimated to be 48.63 MCM. The net ground water availability for future irrigation is estimated at 395.16 MCM. Stage of ground water development varies from 55.80% (Akkalkot) to 101.31% (Malshiras). The overall stage of ground water

development for the district is 78.37%. The stage of GW development is 80.25% in Barshi, 72.14% in Karmala, 81.92% in Madha, 101.31% in Malshiras, 79.94% in Mangalwedha, 89.26% in Mohol, 77.22% in Pandharpur & 76.25% in Sangole. Taluka wise assessments indicates that one Taluka, i.e., Malshiras falls under “Over-exploited”, and seven talukas fall under “Semi Critical” category and three Talukas, namely Akkalkot, Solapur North and Solapur South fall under “Safe” category. The stage of ground water development of Solapur taluka has increased over the period of time from 37.52% in 1998 to 75.49% in 2013 and to 78.37% in 2017.

In major part of the district ground water is potable and its quality is well within permissible limit except, for 54 water samples (~10%) in Aquifer-I and 15 water samples (~10%) in Aquifer-II showing Nitrate contamination (NO_3 concentration more than 45 mg/l). This is a localised Phenomenon mainly due to fertilizer use, seepage from domestic sewage as also contaminated isurface water irrigation. Also, Fluoride concentration more than 1.5 mg/l is observed in 42 water samples of deeper Aquifer (and none of the samples in shallow aquifer). The EC in shallow aquifer varies between 298 (Musti, South Solapur taluka) and 10000 $\mu\text{S}/\text{cm}$ (Akole Kathi, North Solapur taluka). Out of 189 samples collected from dug wells, 14 samples are having EC in range of 2250 to 3000 $\mu\text{S}/\text{cm}$ and only 17 samples have shown EC > 3000 $\mu\text{S}/\text{cm}$. It is observed that the concentration of high EC >2250 $\mu\text{S}/\text{cm}$ has been observed in patches in Pandharpur, North and south Solapur taluka and small parts of Madha and Malshiras taluka. The concentration of EC in deep aquifer varies between 375 (Shelgone, Barshi taluka) and 2910 $\mu\text{S}/\text{cm}$ (Alagi, Akkalkot taluka). Out of 119 samples collected from tube wells/bore wells, 5 samples are having EC more than 2250 $\mu\text{S}/\text{cm}$. It is observed that the concentration of high EC, more than 2250 has been observed in parts of South Solapur and Akkalkot talukas.

Talukawise aquifer management plans have been prepared for Aquifer I (Weathered and jointed fractured Basalt) and Aquifer II (jointed and fractured basalt), with the objective of bringing the current stage of ground water development up to 70% by adopting supply side and demand interventions. The management plan has been proposed to manage the ground water resources and to arrest further decline in water levels. The management plan comprises two components namely supply-side management and demand side management. The supply side Management is proposed based on surplus surface water availability and the unsaturated thickness of aquifer whereas the demand side management is proposed by use of micro irrigation techniques. Change in cropping pattern towards less water-intensive irrigation crops (Demand side intervention) has not been proposed in the area as cash crop cultivation drives the economy of the region. The supply side management of ground water resources can be done through the artificial recharge of surplus runoff available within river sub basins and micro watersheds. Also, it is necessary to understand the unsaturated aquifer volume available for recharge. The unsaturated volume of aquifer was computed based on the area feasible for recharge, unsaturated depth below 5mbgl and the specific yield of the aquifer.

The total unsaturated volume available for artificial recharge is 23445.28 MCM and it ranges from 996 MCM in Malshiras taluka to 2968.72 MCM in Madha taluka. The available surplus runoff can be utilized for artificial recharge through construction of percolation tanks and Check dams at suitable structures. The number of recharge percolation tanks, and check dams are decided based on the depth to water level and

drainage available in the district. Thus, after taking into consideration all the factors, only 268.93 MCM of surplus water can be utilised for recharge. This surplus water can be utilized for constructing 2690 check dams and 940 percolation tanks at suitable sites. The number of feasible artificial recharge structures was calculated by considering 0.20 MCM per percolation tanks and 0.03 MCM per check dam. This intervention should lead to recharge @ 75% efficiency of about 201.7 MCM/year.

Also, roof-top rainwater harvesting can be adopted in 25% of the households in urban areas and 10% of the households in rural areas with 50 Sq. m roof area. This technique is recommended and may be implemented if economically viable.

Demand side interventions such as change in cropping pattern has not been proposed in the area as cash crop cultivation drives the economy of the region. However, there is a scope for increasing areas under micro-irrigation techniques like drip irrigation (about 334 sq km area of sugarcane and 10.3 sq. km. area of onion crop, which is under groundwater irrigation is proposed to be covered under Drip). Volume of Water expected to be saved is estimated as 190.38 MCM in sugarcane crop (Sugarcane Surface Flooding irrigation req- 2.45 m. Drip Req. - 1.88, WUE- 0.57 m) and 2.678 MCM in Onion crop (Onion requirement - 0.78 m, Drip - 0.52 m, WUE- 0.526 m). Total water saved by implementing Drip irrigation would be 193.06 MCM.

After implementing supply – side and demand-side interventions, balance ground water resources available for further ground water development to achieve 70% Stage of Ground Water Extraction is 219.37 MCM, which can bring additional 337.49 sq. km. area under assured ground water irrigation by future construction of 16791 number of dugwells (@ 1.5 ham for 90% of GWR available) and 1462 number of borewells (@1.5 ham for 10% of GWR available) in phased manner for 6 years

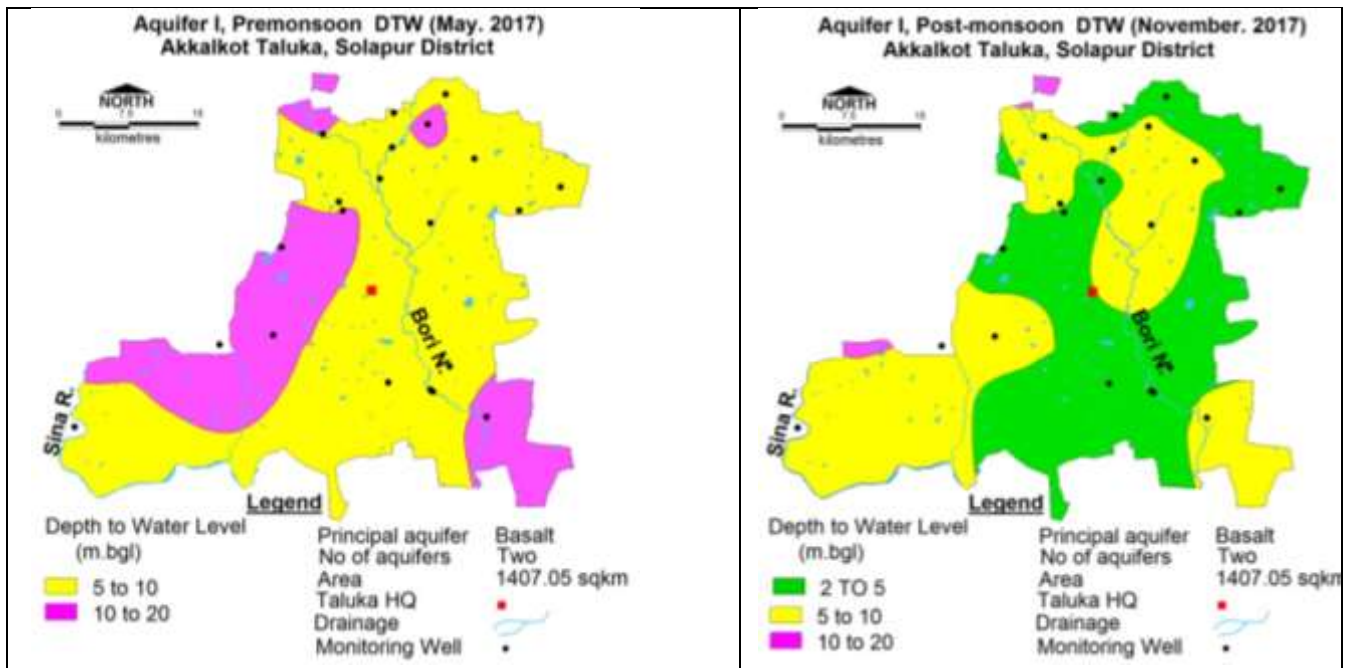
These interventions also need to be supported by regulation of deeper aquifer and hence it is recommended to regulate/ban deeper tubewells/borewells of more than 60 m depth in these talukas, so that the deeper ground water resources are protected for future generation and also serve as ground water sanctuary in times of distress/drought. IEC activities and capacity building activities need to be aggressively propagated to establish the institutional framework for participatory ground water management.

9. AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN

9.1 AKKALKOT TALUKA, SOLAPUR DISTRICT, MAHARASHTRA

1. SALIENT INFORMATION	
1.1. Introduction	
Taluka Name	Akkalkot
Geographical Area (Sq. Km.)	1414
Hilly Area (Sq. Km)	0.00
Saline Area (Sq. Km.)	0.00
Population (2011)	314570
Climate	Tropical
1.2 Rainfall Analysis	
Annual Rainfall (2019) (mm)	598.5
Decadal Average Annual Rainfall (2010-19) (mm)	532.3 mm
Normal Rainfall (mm)	766.8 mm
Long Term Rainfall Analysis (1901-2019)	Falling Trend -1.34 mm/year Probability of Normal/Excess Rainfall- 55% & 11%. Probability of Drought (Moderate/Severe)-: 28% Moderate & 6 % Severe.
Rainfall Trend Analysis (1906 To 2019) EQUATION OF TREND LINE: $y = -1.339x + 759.5$	
1.3. Geomorphology & Geology	
Geomorphic Unit	Major parts of the taluka is Plateau slightly Dissected (PLS), with weathered thickness ranging from 0 to 1 m with isolated hills (Mesa and Butte) and steep sloped valley areas forming Plateau moderately Dissected (PLM - 0 to 1m weathering and PLWS - 0 to 2m weathering)
Soil	In general, they are clayey loam in texture and fairly high in calcium carbonate, high porosity but moderate to low permeability, thus having low to moderate infiltration capacity. Based on physical characteristics the soils of the area have been classified into three major groups: Medium black soil, Red Sandy soils and Shallow black soils
Geology	Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene
1.4. Hydrology & Drainage	
Hydrology	
Bigger Minor Irrigation Project (>100 Ha.)	Completed: : 1 medium & 20 MI Tanks
Minor Irrigation Project (<100 Ha.)	Completed: 67 PT, 772 KT weirs & 50 DB

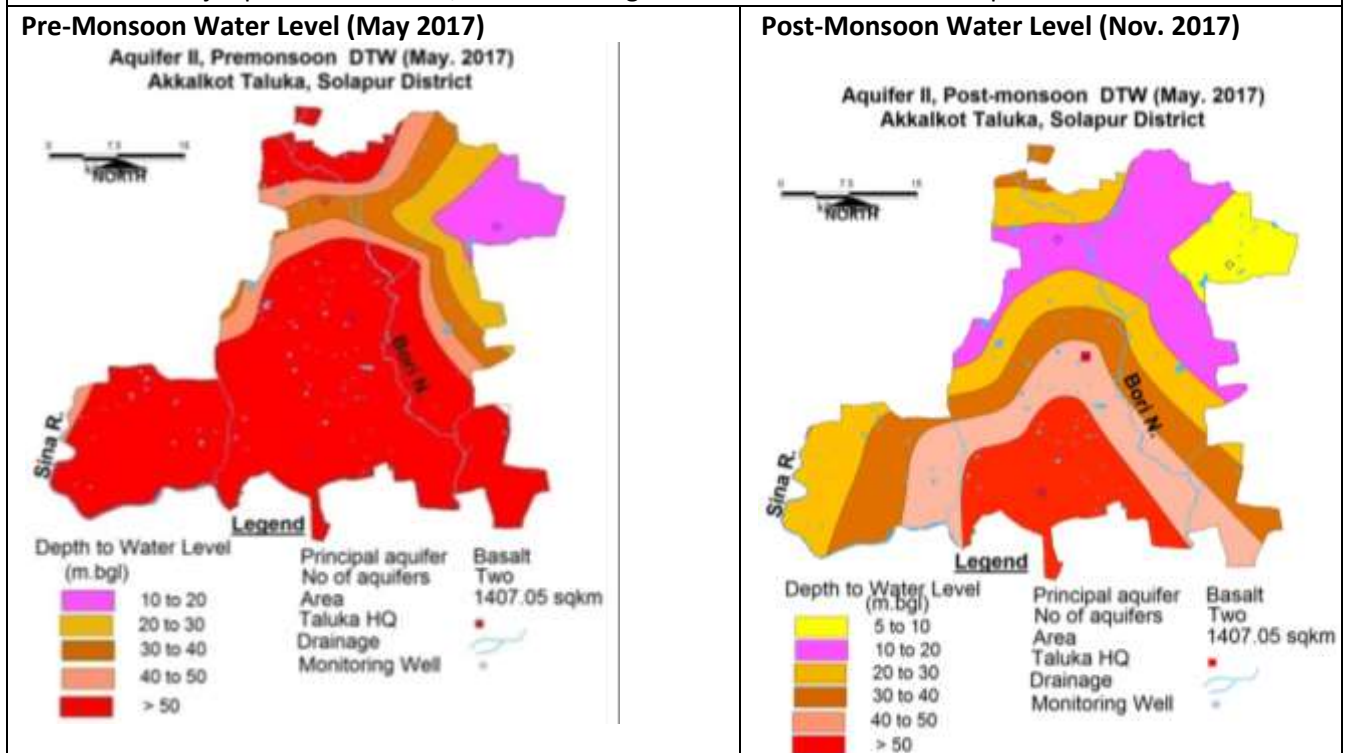
Drainage	The taluka falls in Bhima subbasin. The taluka is drained by Bhima river and its tributaries i.e. Bori Nadi and Harni Nadi, flowing Southwards.	
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern		
Geographical Area (Sq. Km.)	1414.0	
Forest Area (Sq. Km.)	21.40	
Net Sown Area (Sq. Km.)	908.02	
Double Cropped Area (Sq. Km.)	41.76	
Gross Cropped Area (sq.km)	949.78	
Cultivable Area (Sq. Km.)	1335.79	
Area under Irrigation (Sq. Km.)		
Ground Water	111.58	
Surface Water	4.42	
Principal Crops	Area (Sq. Km.)(Reference year 2013-14)	
Wheat	101.02	
Jawar	418.07 (dry)	
Bajra	16.93 (dry)	
Maize	29.07 (dry)	
Gram	167.13 (dry)	
Tur	616.07 (dry)	
Sugarcane	115.46	
Chilli	4.1	
Fruits	21.25	
Onion	16.88	
Sunflower etc. oils	57.82 (dry)	
1.6. Water Level Behaviour		
1.6.1. Phreatic Aquifer-Water Level		
Pre-Monsoon (May-2017)- Water level ranges from 7.3 m.bgl at Gogaon to 11.4 mbgl at Kini. Water level in the range of 5 to 10 mbgl has been observed in major part of the taluka, while water level in the range of 10 to 20 mbgl is observed in western and south-eastern part of the taluka.		
Post-Monsoon (November-2017)- Water level ranges from 2.5 m.bgl at Sultanpur and Wagdari to 8.6mbgl at Dudhani (Rural).. Water level in the range of 2 to 5 mbgl has been observed in major part of the taluka, and water level in the range of 5 to 10 mbgl is recorded in large patches in south-eastern, south-western and north-central areas of the taluka. Water level in the range of 10 to 20 mbgl is observed in isolated wells in south-western and northern part of the taluka		
Pre-Monsoon Water Level (May 2017)		Post-Monsoon Water Level (Nov. 2017)



1.6.2. Semi-Confined/Confined Aquifer-Water Level

Pre-Monsoon (May-2017)- Water level less than 20 mbgl is observed in northern part of the taluka; deeper water level between 40 to 50 mbgl is observed in major part in the north-eastern, central and southern part of the taluka .

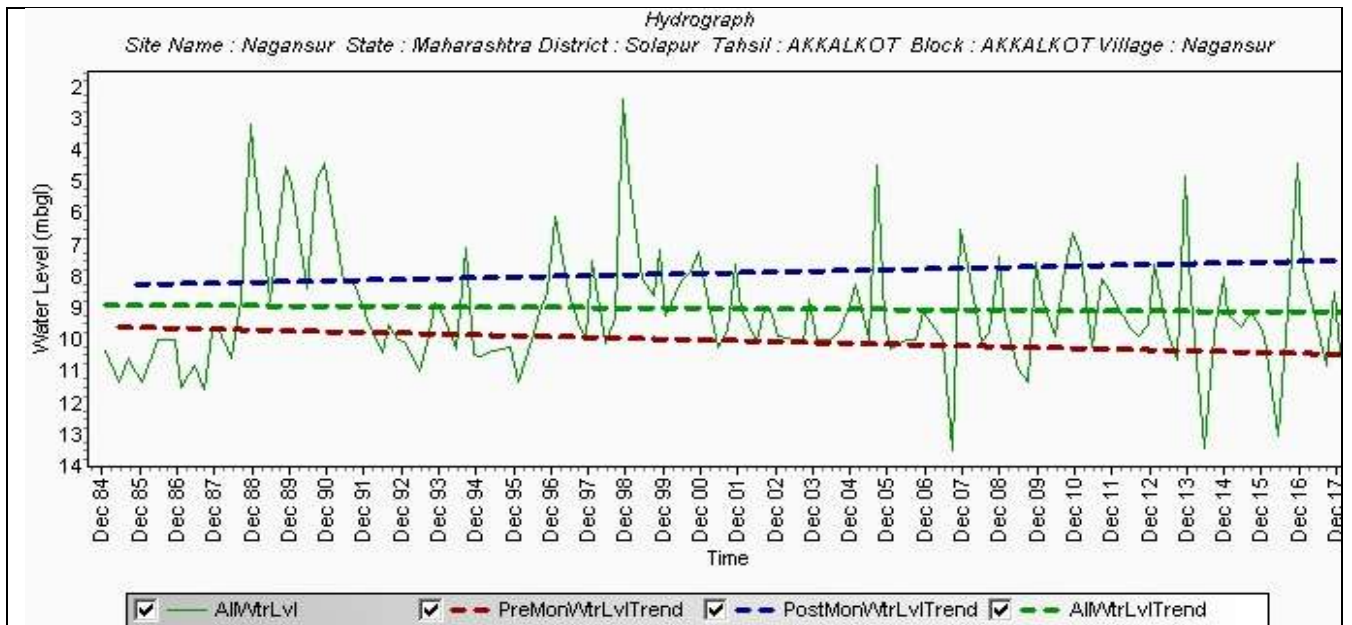
Post-Monsoon (November-2017)- Water level <10 mbgl is observed in north-eastern parts of the taluka; 10 to 20 mbgl is observed in north-central part of the taluka. Water level in the range of 20 to 40 mbgl is observed in major part of the taluka, while >50 mbgl is observed in south-central part of the taluka.



1.6.4. Hydrograph

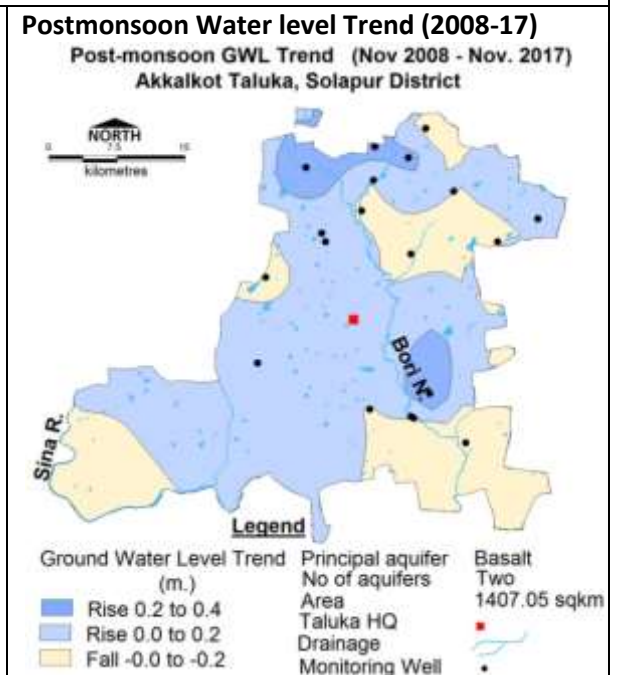
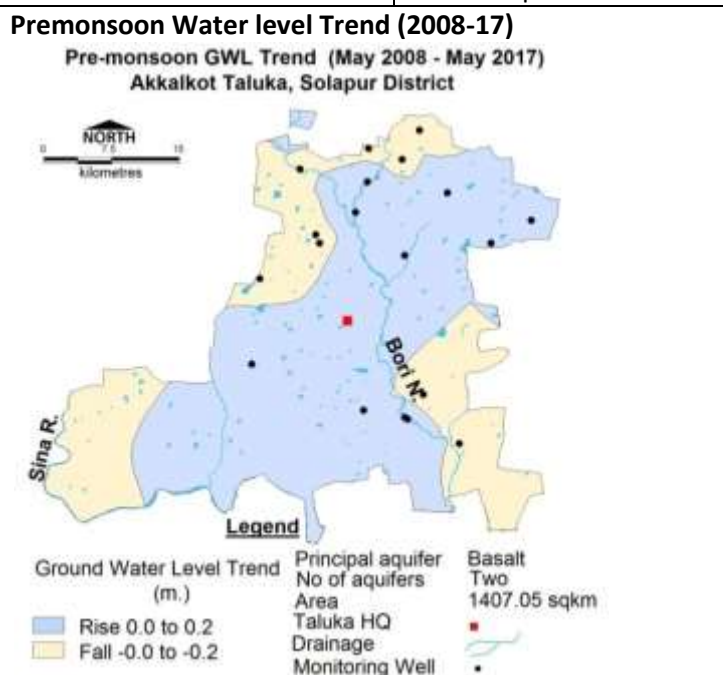
Hydrograph shows Pre-monsoon falling trend @ 0.0022 m/year

Hydrograph shows Post-monsoon rising trend @ 0.0019 m/year



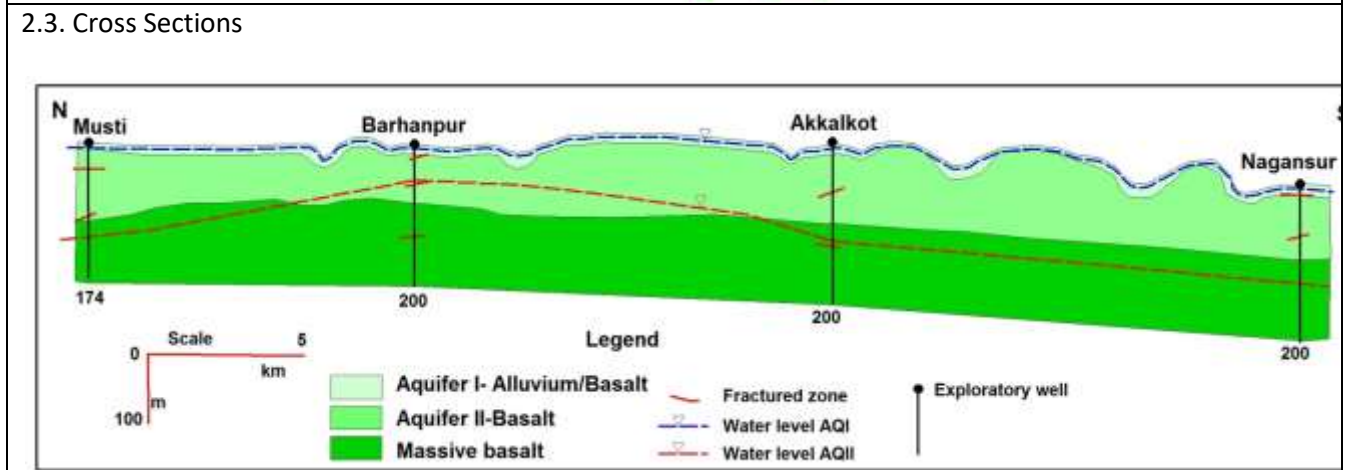
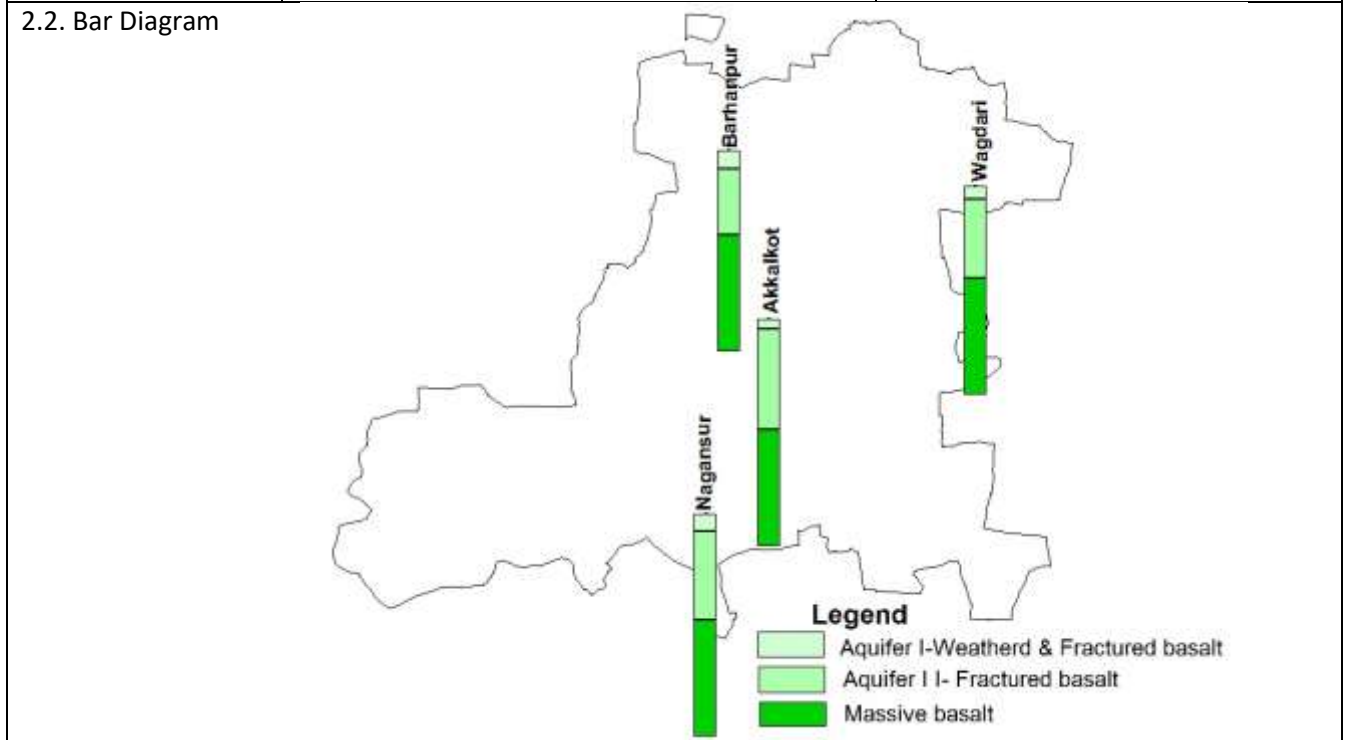
1.6.3. Water Level Trend (2008-2017)

Pre-Monsoon trend	Rising : 0.0253 m/year at Udagi to 0.1987 m/year at Dudhani (Rural)
	Falling : 0.0039 m/year at Arali to 0.2184 m/year at Chikkahalli
	Rising water level trend up to 0.2 m/year is observed in about major part area of the taluka; Declining water level trend up to 0.2 m/year has been observed in south-western, south-eastern and north-western and east-central part of the taluka.
Post-Monsoon trend	Rising : 0.045 m/year at Gogaon to 0.3443 m/year at Basalegaon
	Falling : 0.002 m/year at Borgaon to 0.125 m/year at Binjger
	Rising water level trend up to 0.2 m/year is observed in major part of taluka and rising trend in the range of 0.2 to 0.4 is observed in an isolated patch in east-central part; Declining water level trend up to 0.2 m/year has been observed in south-western and south-eastern part and in isolated parts in northern part of the taluka.



2. AQUIFER DISPOSITION

2.1. Number of Aquifers	Aquifer-I-Basalt	Aquifer-II-Basalt
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2.4. Aquifer Characteristics	Aquifer-I	Aquifer-II
Major Aquifers	Basalt	Basalt
Type of Aquifer	Aquifer-I (Phreatic)	Aquifer-II (Semi-confined/confined)
Depth of Occurrence (mbgl)	8 - 30	60 - 196
Thickness of weatherd /fracture rocks (m)	5 – 15 m	2.0 – 9.0 m
Yield	10 - 100 m ³ /day	0.1 - 3 lps
Specific yield (Sy)	0.01- 0.02	0.005
Storativity (S)		0.000057
Transmissivity (T) (m ² /day)	T: 5-20 m ² /day	T: 30-70 m ² /day

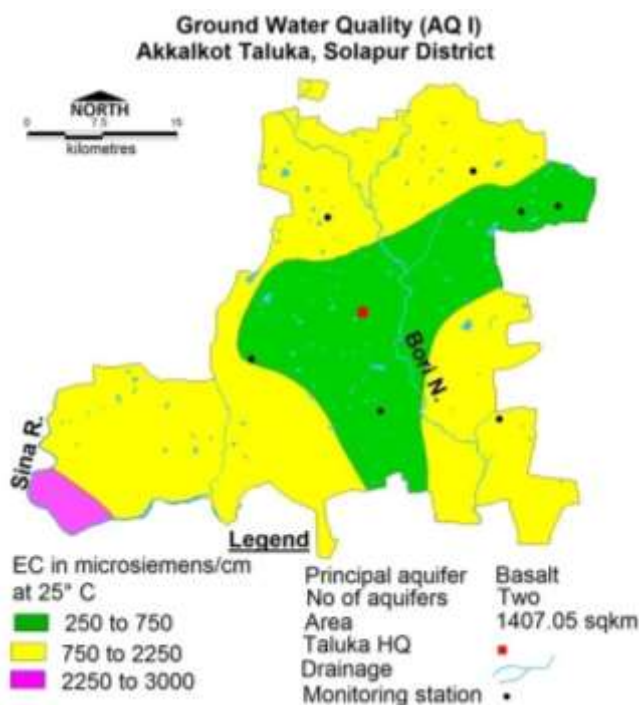
3. GROUND WATER QUALITY

3.1 Phreatic Aquifer (Aquifer-I) : In general the water quality of shallow aquifer in Akkalkot taluka is potable

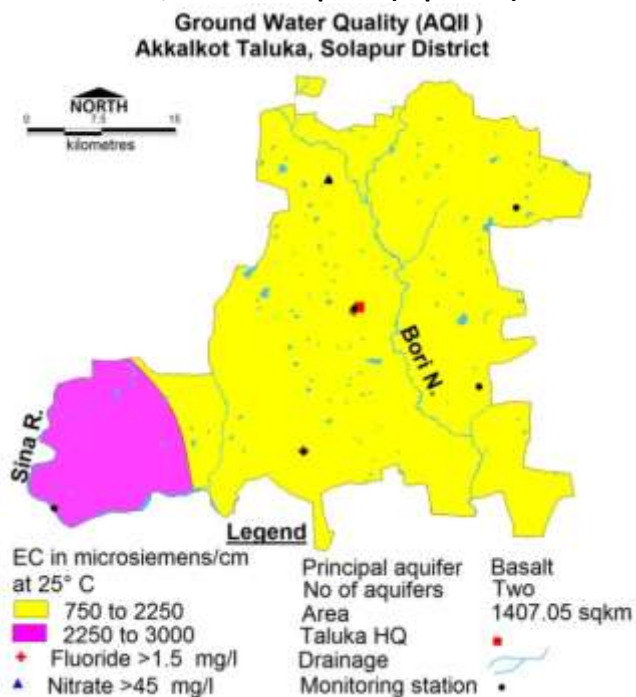
and good for drinking, domestic, industrial as well as irrigation purposes.

3.2: Semiconfined/Confined Aquifer (Aquifer II): In general the water quality of deep aquifer in Akkalkot taluka is potable and very good for drinking, domestic, industrial as well as irrigation purposes. Fluoride more than 1.5 mg per litre was detected in water sample from Nagansur and Akkalkot EW. Nitrate greater than 45 mg per litre was detected in water sample from Barhanpur EW. Very high salinity (>2250 $\mu\text{S}/\text{cm}$) prevails at Alagi, which is not suitable for drinking, domestic, industrial as well as irrigation purposes. Ground water can be used for drinking only after treatment and for irrigation for very high salt tolerant crops and with proper soil and crop management practices.

Phreatic Aquifer (Aquifer-I)



Semiconfined/Confined Aquifer (Aquifer II)



4. GROUND WATER ISSUES

Scanty rainfall
Limited Aquifer Potential
Water Scarcity - lean period
Cropping of water intensive crops

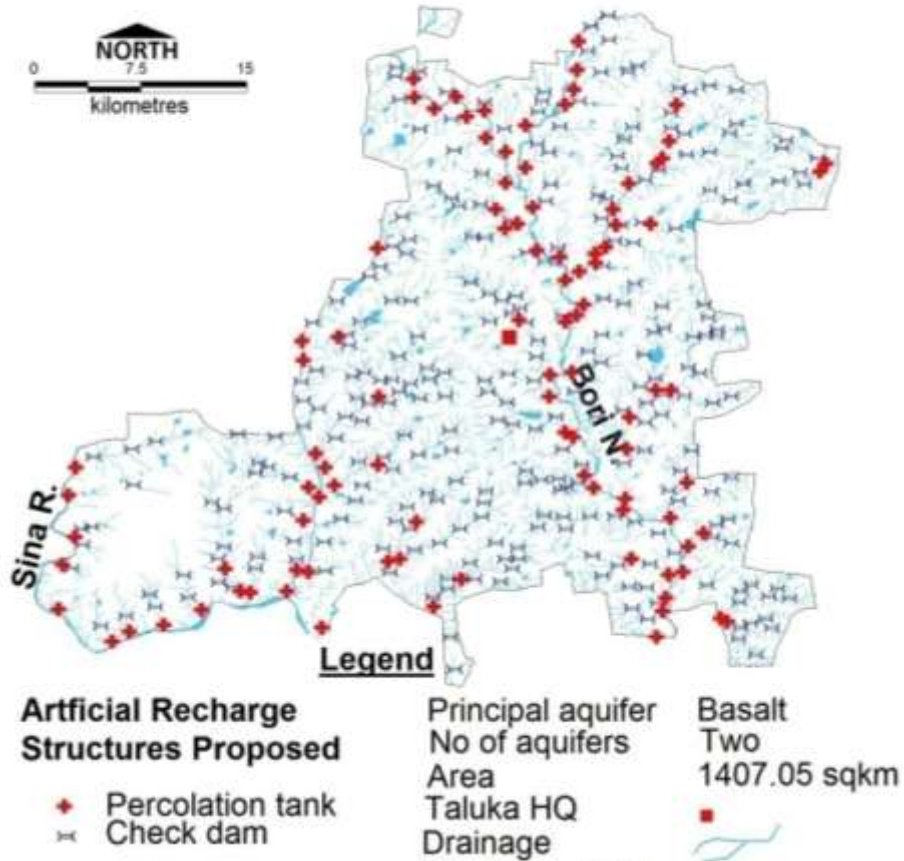
5. GROUND WATER RESOURCE & EXTRACTION

5.1. Aquifer-I/ Phreatic Aquifer (Basalt)

Ground Water Recharge Worthy Area (Sq. Km.)	1407.05
Total Annual Ground Water Recharge (MCM)	140.9
Natural Discharge (MCM)	7.04
Net Annual Ground Water Availability (Annual Extractable Ground Water Recharge) (MCM)	133.85
Existing Gross Ground Water Extraction for irrigation (MCM)	69.68
Existing Gross Ground Water Extraction for domestic and industrial water supply(MCM)	5
Existing Gross Ground Water Extraction for All uses(MCM)	74.68
Provision for domestic and industrial requirement supply to 2025(MCM)	5.8
Net Ground Water Availability for future irrigation development (MCM)	58.37
Stage of Ground Water Development (%)	55.80

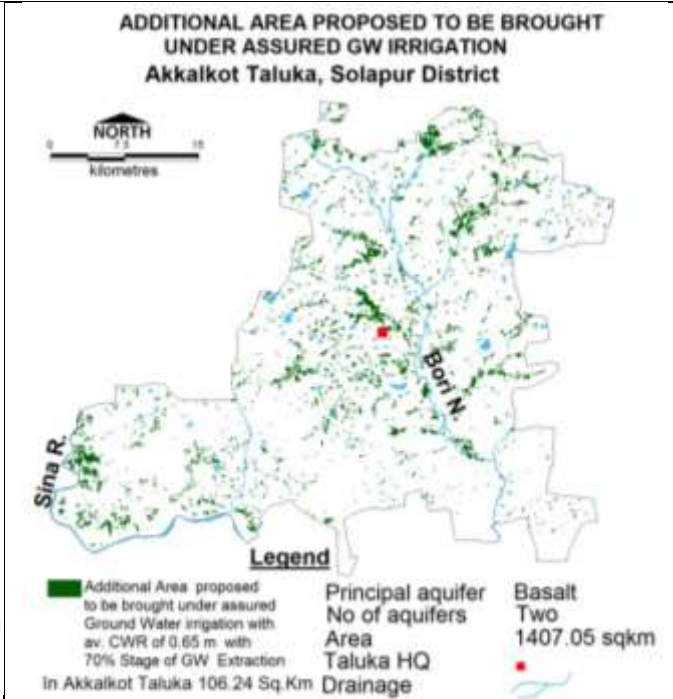
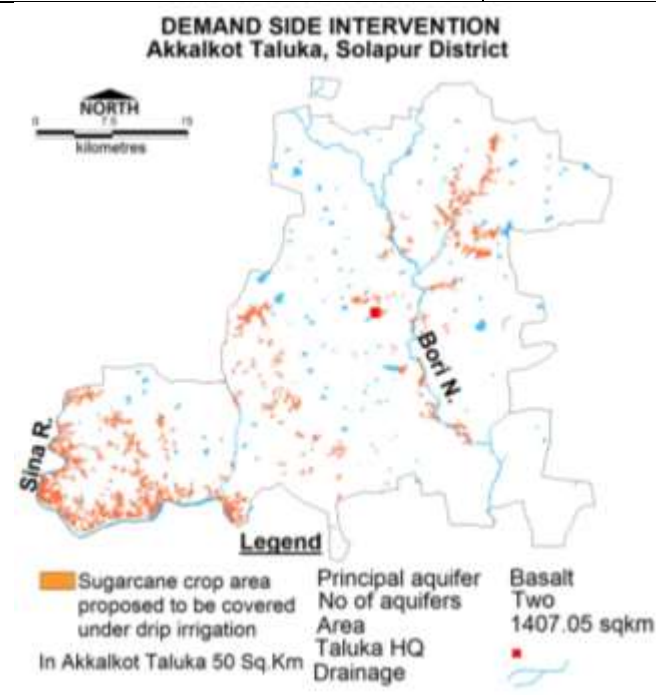
Category					SAFE		
5.2 Aquifer-II - Semiconfined/Confined Aquifer (Basalt)							
Area (sq.km)	Mean thickness (m)	Piezometric head (meter above bottom of confining layer)	Sy	S	Resource above confining layer (mcm)	Resource in confining aquifer (mcm)	Total Resource (mcm)
1407.533	1.25 to 9	55 to 90	0.005	5.7E-05	24.57327	5.11066	29.684
6.0. GROUND WATER RESOURCE ENHANCEMENT							
6.1 SUPPLY (MCM)							
Stage of GW Development			55.80%				
Annual Available Resource (MCM)			133.85				
Gross Annual Draft (MCM)			74.68				
SUPPLY (MCM)							
Agricultural Supply -GW			69.68				
Agricultural Supply -SW			210.08				
Domestic Supply - GW			5.00				
Domestic Supply - SW			1.25				
Total supply (MCM)			286.01				
6.2. Supply Side Management							
Rainwater Harvesting and Artificial Recharge							
Area feasible for recharge (sq. km.)			1142.73				
Unsaturated Volume (MCM)			2295.19				
Surplus water available for AR (MCM)			28.11				
Proposed Structures			Percolation Tank (@ Rs.150 lakh, Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)		Check Dam (@ Rs.30 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)		
Number of Structures			98		281		
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)			14.74		6.34		
Current Annual Resource Availability (MCM)			133.85				
Current Annual Groundwater Extraction (MCM)			74.68				
Total GW resource available after supply side intervention (MCM)			154.94				
Stage of GWD after supply side interventions (%)			48.2				
Ground water available TO BRING STAGE OF GWD UPTO 70%			33.77				

Artificial Recharge Akkalkot Taluka, Solapur District



RTRWH - Urban Areas	May be implemented if Economically viable
Households to be covered (10% with 50 m ² considering roof top area)	5998
Total RWH potential (MCM)	0.17
Rainwater harvested / recharged @ 80% runoff co-efficient	0.14
Micro irrigation techniques	
Geographical Area (sq.km)	1401.3
Area proposed to be covered under drip (sq.km)	
Sugarcane	50
Onion	2
Volume of Water expected to be saved with drip irrigation (MCM)	
Sugarcane	28.5
Onion	0.52
Total Volume of Water expected to be saved (MCM)	29.02
Total GW Draft after Demand side intervention	45.66
Stage of GWD after demand side interventions (%)	29.47
GWR available/required to bring the STAGE OF GWD isto 70% (MCM)	62.79
Additional Area (sq.km.) proposed to	96.6

be brought under assured GW irrigation #2



7.0. EXPECTED BENEFITS

Annual Extractable Ground Water Recharge (MCM)	133.85
Current Annual Ground Water Extraction (MCM)	74.68
Water Recharged by Supply side intervention (MCM)	21.08
Water saving by demand side intervention (MCM)	29.02
Present Stage of Ground Water Extraction (%)	55.79
Ground water resources after supply side management (MCM)	154.94
Ground water Draft after demand side management (MCM)	45.66
Expected Stage of Ground Water Extraction after Supply and Demand side interventions (%)	29.47

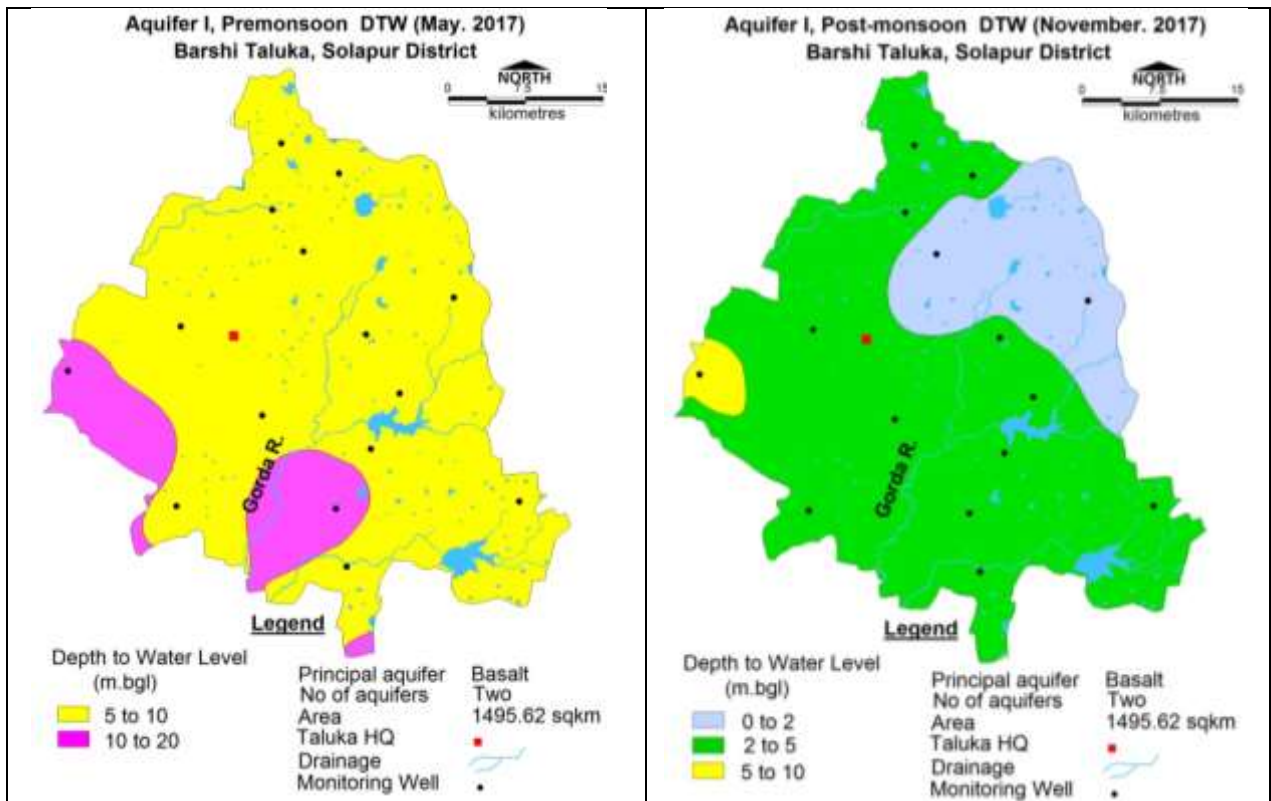
8. DEVELOPMENT PLAN

Volume of water available for GWD to enhance stage of GWD to 70% (MCM)	69.058
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	3767
Proposed Number of BW (@ 1.5 ham for 10% of GWR Available)	419
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	96.6

9.2 BARSHI TALUKA, SOLAPUR DISTRICT, MAHARASHTRA

1. SALIENT INFORMATION	
1.1. Introduction	
Taluka Name	Barshi
Geographical Area (Sq. Km.)	1541.6
Hilly Area (Sq. Km)	14.32
Saline Area (Sq. Km.)	0.00
Population (2011)	372711
Climate	Tropical
1.2 Rainfall Analysis	
Annual Rainfall (2019)(mm)	589.0
Decadal Average Annual Rainfall (2010-19) (mm)	584.0 mm
Normal Rainfall (mm)	679.2 mm
Long Term Rainfall Analysis (1901-2019)	Trend -0.694 mm/year Probability of Normal/Excess Rainfall- 62% & 14%. Probability of Drought (Moderate/Severe)-: 22 % Moderate & 5 % Severe.
Rainfall Trend Analysis (1901 To 2019) EQUATION OF TREND LINE: $y = 0.694x + 527.4$	
1.3. Geomorphology & Geology	
Geomorphic Unit	Major parts of the taluka is Plateau slightly to moderately Dissected (PLS and PLM), with weathered thickness ranging from 0 to 1 m with isolated hills (Mesa and Butte) in the northern part of the taluka and valley areas with steep slopes forming Plateau weathered (PLWS - 0 to 2m weathering). A small area in the forms Alluvial Plain (AYM) partly under Canal Command (APC).
Soil	In general, they are clayey loam in texture and fairly high in calcium carbonate, high porosity but moderate to low permeability, thus having low to moderate infiltration capacity. Based on physical characteristics the soils of the area have been classified into three major groups: Medium black soil, Red Sandy soils and Shallow black soils
Geology	Alluvium: sand/ silt and clay alternating beds - Age: Recent to Sub-recent Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene

1.4. Hydrology & Drainage	
Hydrology	
Bigger Minor Irrigation Project (>100 Ha.)	Completed: : 3 medium & 25MI Tanks
Minor Irrigation Project (<100 Ha.)	Completed: : 113 PT, 107 KT weirs & 59 DB
Drainage	The taluka falls in Bhima sub-basin. The taluka is drained by Sina river and its left bank tributaries i.e. Gorda River and Bhogawati River. While Sina River flows from North to south, Gorda River and Bhogawati River flow from East to West direction.
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern	
Geographical Area (Sq. Km.)	1541.6
Forest Area (Sq. Km.)	22.04
Net Sown Area (Sq. Km.)	1231.29
Double Cropped Area (Sq. Km.)	36.82
Gross Cropped Area (Sq.km.)	1268.11
Cultivable Area (Sq. Km.)	1413.70
Area under Irrigation (Sq. Km.)	
Ground Water	111.58
Surface Water	4.42
Principal Crops	Area (Sq. Km.)(Reference year 2013-14)
Wheat	43.3
Jawar	562.31 (dry)
Maize	22.88 (dry)
Gram	79.0 (dry)
Tur	110.84 (dry)
Udad	80.9 (dry)
Sugarcane	66.63
Grapes	13.8
Mango	4.17
Onion	37.94
Cotton	6.38
1.6. Water Level Behaviour	
1.6.1. Phreatic Aquifer-Water Level	
Pre-Monsoon (May-2017) - Water level ranges from 5.8 m.bgl at Kuslamb to 16 mbgl at Vairag. Water level in the range of 5 to 10 mbgl has been observed in major part of the taluka, while water level in the range of 10 to 20 mbgl is observed in west-central and south-western parts of the taluka.	
Post-Monsoon (November-2017) - Water level ranges from 0.5 m.bgl at Kuslamb to 6.0 mbgl at Shendri.. Water level less than 2 m.bgl is observed in the eastern part of the taluka. Water level in the range of 2 to 5 mbgl has been observed in major part of the taluka, and water level in the range of 5 to 10 mbgl is recorded in a small patches in the west–central areas of the taluka.	
Pre-Monsoon Water Level (May 2017)	Post-Monsoon Water Level (Nov. 2017)



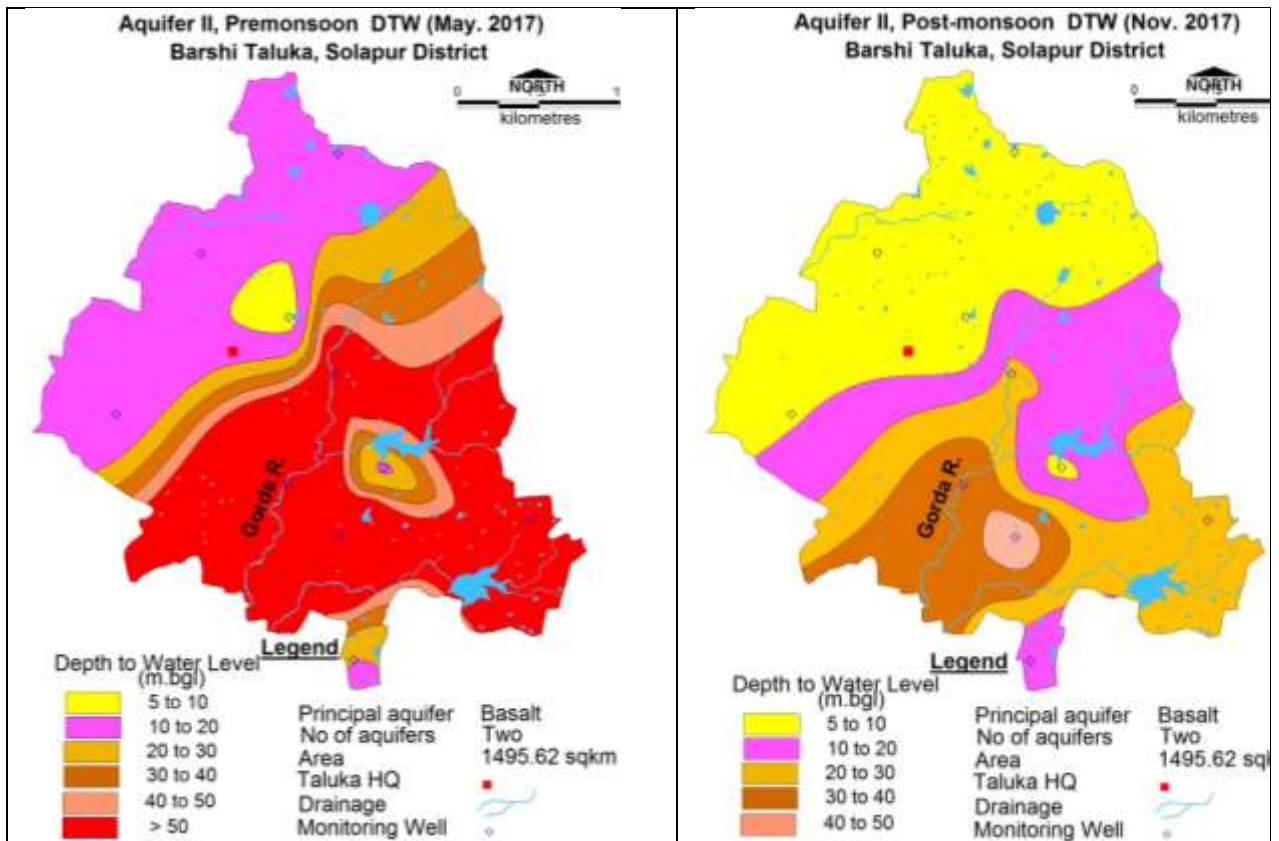
1.6.2. Semi-Confined/Confined Aquifer-Water Level

Pre-Monsoon (May-2017)- Water level less than 20 mbgl is observed in northern part of the taluka; deeper water level between 20 to 50 mbgl is observed in the central and southern part of the taluka while >50 mbgl is observed in major part in southern half of the taluka..

Post-Monsoon (November-2017)- Water level <10 mbgl is observed in northern parts of the taluka; 10 to 30 mbgl is observed in major part of the taluka. Water level in the range of 30 to 50 mbgl is observed in south-western part of the taluka.

Pre-Monsoon Water Level (May 2017)

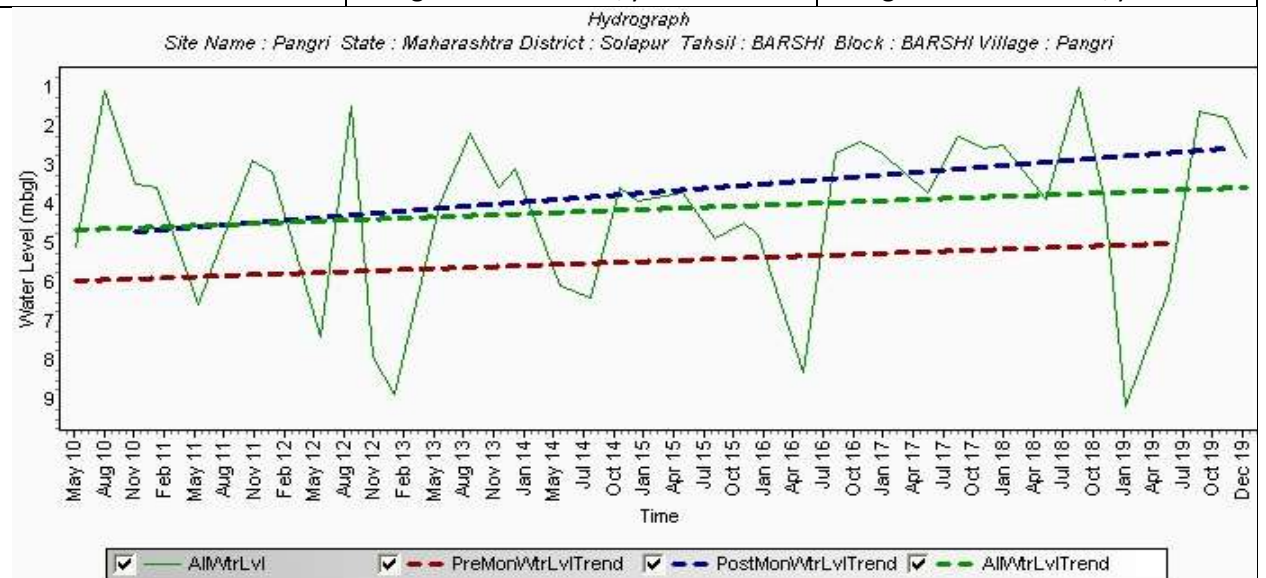
Post-Monsoon Water Level (Nov. 2017)



1.6.4. Hydrograph

Hydrograph shows Pre-monsoon rising trend @ 0.02 m/year

Hydrograph shows Post-monsoon rising trend @ 0.018 m/year

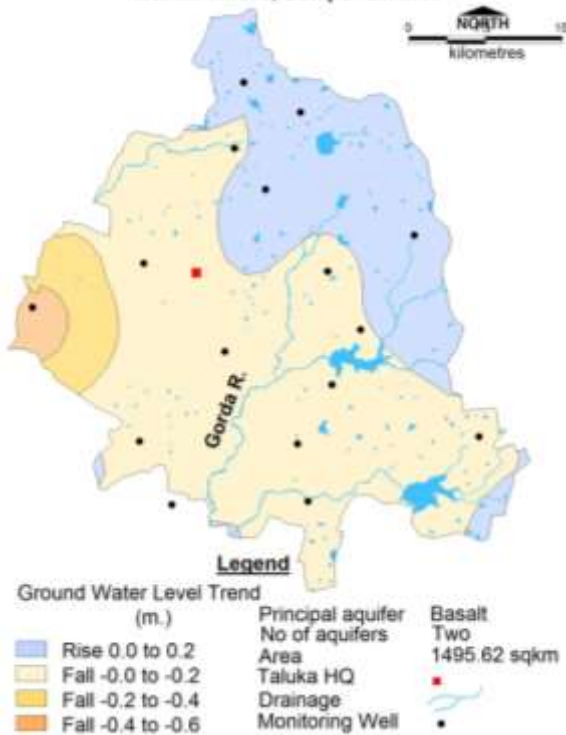


1.6.3. Water Level Trend (2008-2017)

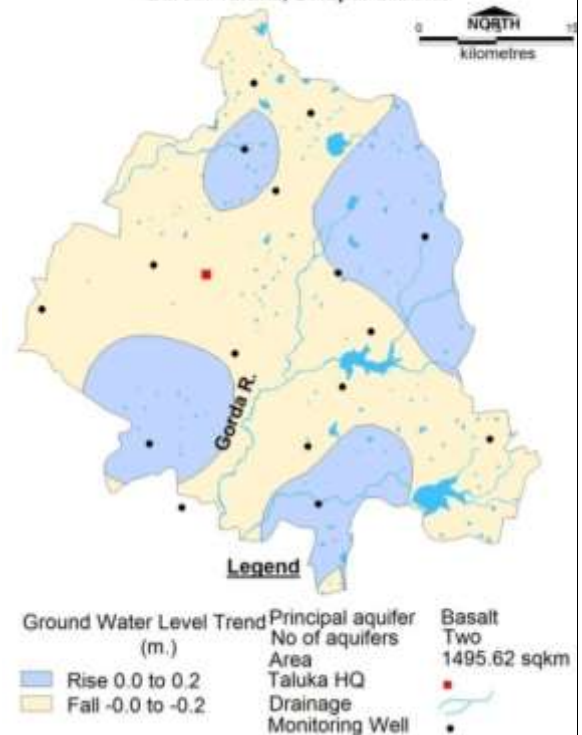
Pre-Monsoon trend	Rising : 0.00391 m/year at Jangaon to 0.4648 m/year at Shendri.
	Falling : 0.01937 m/year at Kalambawadi (A) to 0.14819 m/year at Chare
	Rising water level trend up to 0.2 m/year is observed in about north-eastern part and south-eastern fringe area of the taluka; Declining water level trend up to 0.2 m/year has been observed in major part in western part of the taluka, while a small patch in the west-central part has experienced falling trend upto 0.8 m, in water level.
Post-Monsoon trend	Rising : 0.00067 m/year at Chikharde to 0.05063 m/year at Chare
	Falling : 0.06321 m/year at Agalgaon to 0.15797 m/year at Kari

Falling water level trend up to 0.2 m/year is observed in major part of taluka. Rising water level trend up to 0.2 m/year has been observed in patches in south-western, south-central, eastern and northern part of the taluka.

Premonsoon Water level Trend (2008-17)
Pre-monsoon GWL Trend (May 2008 - May 2017)
Barshi Taluka, Solapur District



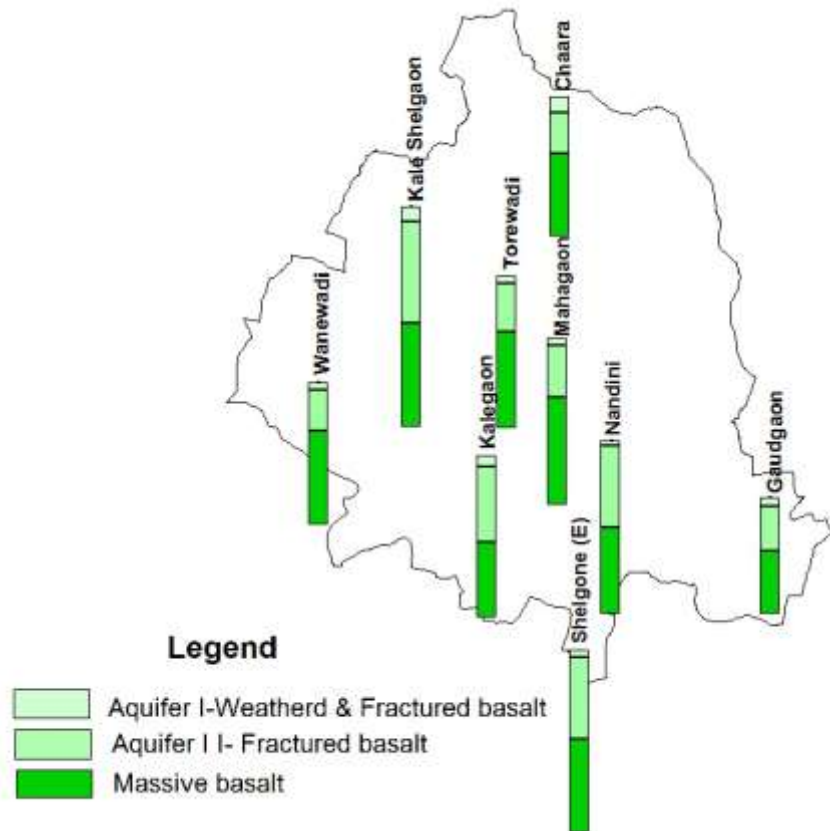
Postmonsoon Water level Trend (2008-17)
Post-monsoon GWL Trend (Nov 2008 - Nov. 2017)
Barshi Taluka, Solapur District



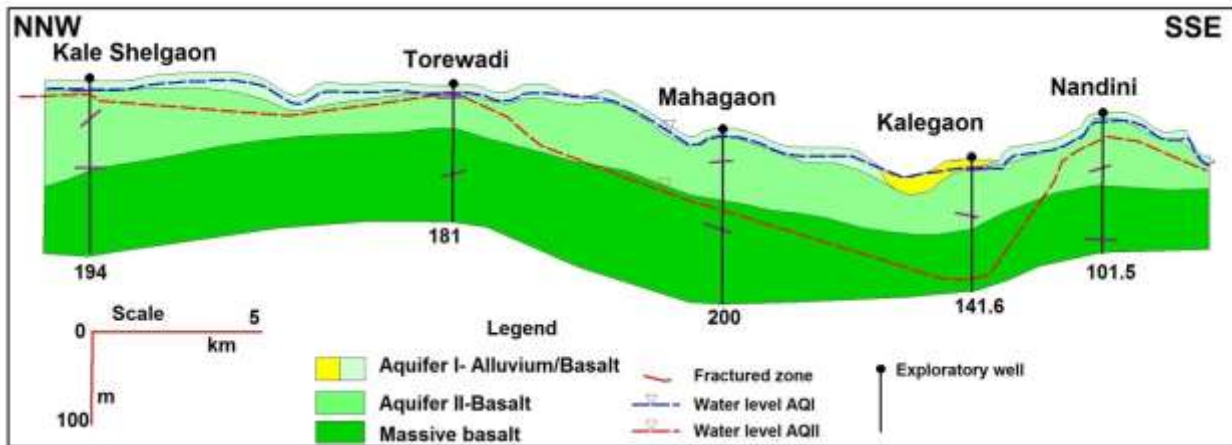
2. AQUIFER DISPOSITION

2.1. Number of Aquifers	Aquifer-I-Basalt	Aquifer-II-Basalt
-------------------------	------------------	-------------------

2.2. Bar Diagram



2.3. Cross Sections



2.4. Aquifer Characteristics

Major Aquifers	Basalt (shallow alluvium in a small patch)	Basalt
Type of Aquifer	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)
Depth of Occurrence (mbgl)	8 - 30	60 - 196
Thickness of wearherd /fractured rocks (m)	5 - 15	1.25 - 11
Yield	10 - 100 m ³ /day	0.1 - 4 lps
Specific yield (Sy)	0.018- 0.02	0.0025 to 0.003
Storativity (S)		0.000012
Transmissivity (T)	T: 5-20 m ² /day	T: 30-70 m ² /day

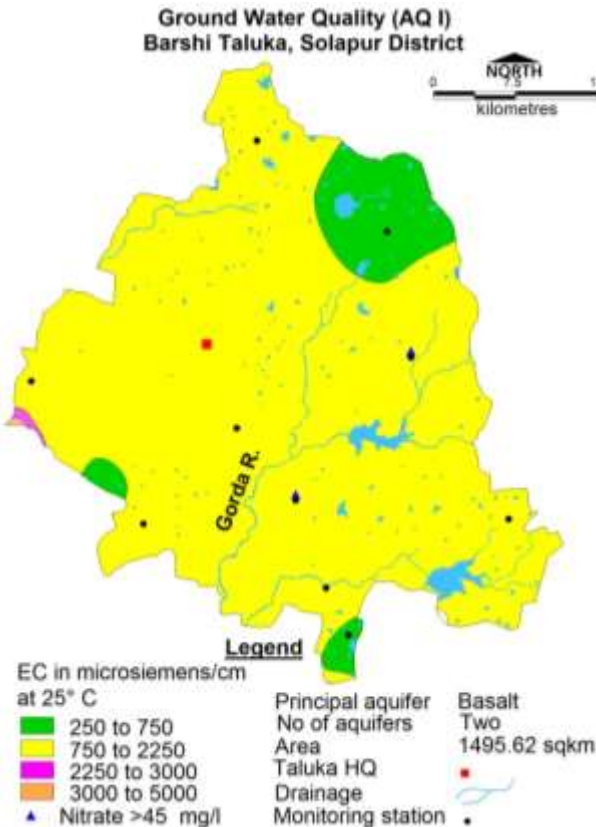
(m²/day)

3. GROUND WATER QUALITY

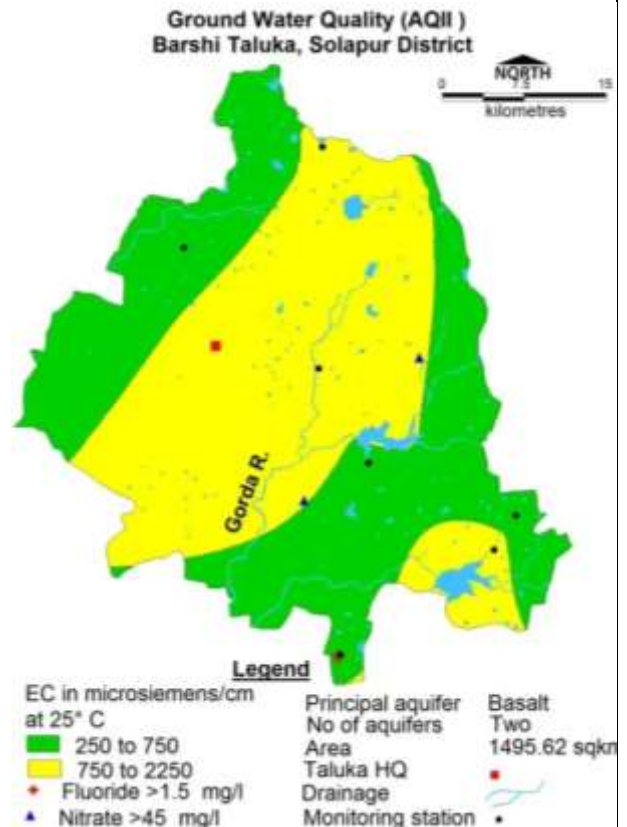
3.1 Phreatic Aquifer (Aquifer-I) : In general the water quality of shallow aquifer in Barshi taluka is potable and good for drinking, domestic, industrial as well as irrigation purposes. Nitrate more than 45 mg per litre was detected in water sample from Pangri, Manegaon and Nari. At Raleras very high salinity prevails (>2250 µS/cm), which is not suitable for drinking, domestic, industrial as well as irrigation purposes. Ground water can be used for drinking only after treatment and for irrigation for very high salt tolerant crops and with proper soil and crop management practices.

3.2: Semiconfined/Confined Aquifer (Aquifer II) : In general the water quality of deep aquifer in Barshi taluka is potable and very good for drinking, domestic, industrial as well as irrigation purposes. Nitrate more than 45 mg per litre was detected in water sample from Manegaon and Nari. Fluoride more than 1.5 mg per litre was detected in water sample from Shelgone (E) Shelgone (E) Shelgone (E) EW.

Phreatic Aquifer (Aquifer-I)



Semiconfined/Confined Aquifer (Aquifer II)



4. GROUND WATER ISSUES

Scanty rainfall
 Limited Aquifer Potential
 Water Scarcity - lean period
 Cropping of water intensive crops

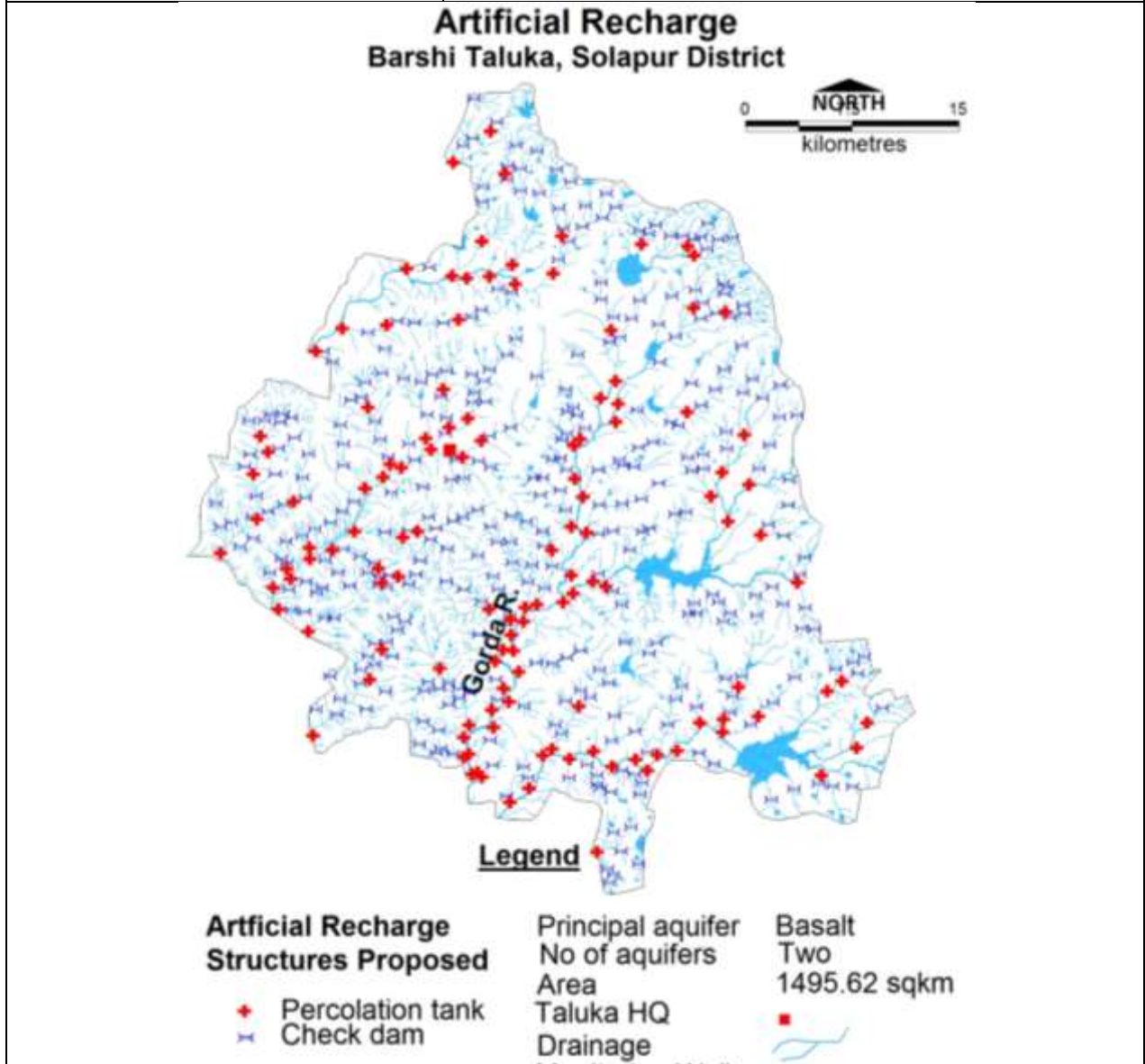
5. GROUND WATER RESOURCE & EXTRACTION

5.1. Aquifer-I/ Phreatic Aquifer (Basalt)

Ground Water Recharge Worthy Area (Sq. Km.)	1495.62
Total Annual Ground Water Recharge (MCM)	106.15
Natural Discharge (MCM)	5.31
Net Annual Ground Water Availability (Annual Extractable Ground Water Recharge) (MCM)	100.84
Existing Gross Ground Water Extraction for irrigation (MCM)	76.27
Existing Gross Ground Water Extraction for domestic and industrial water supply(MCM)	4.66

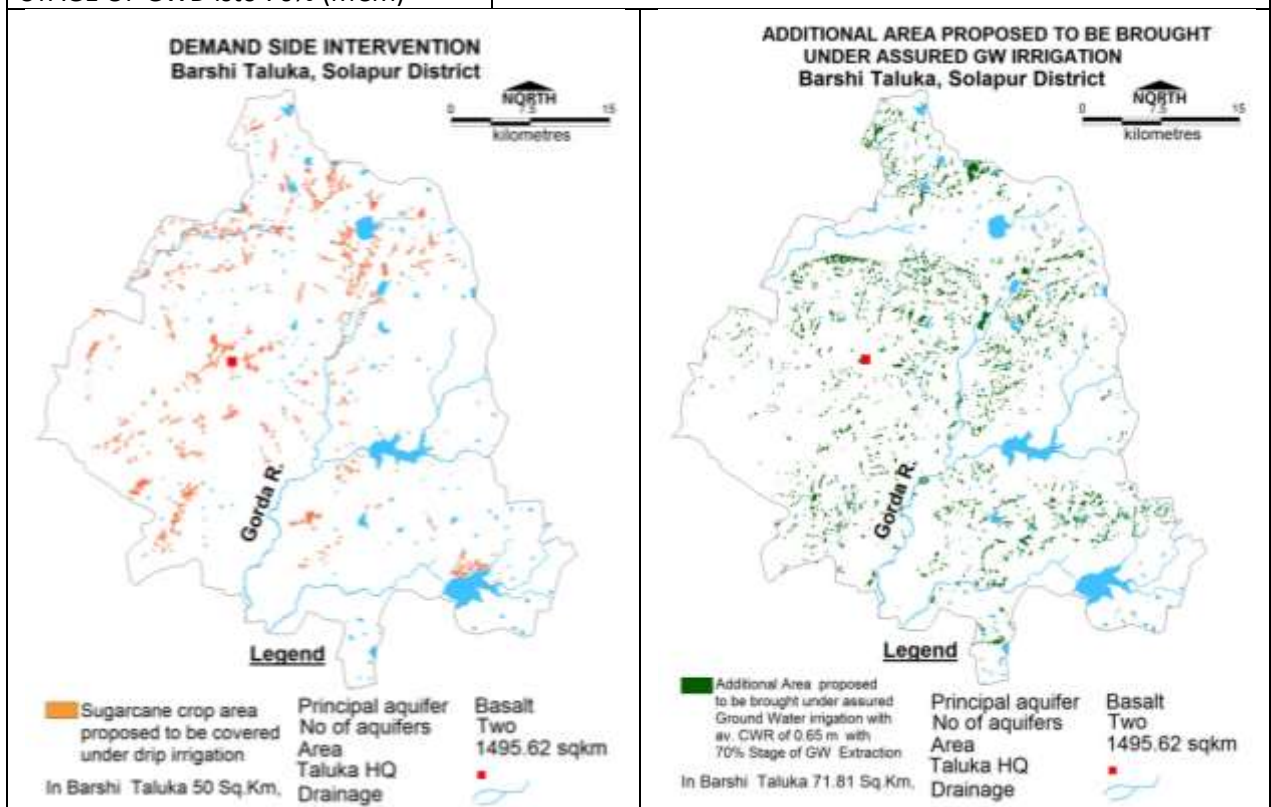
Existing Gross Ground Water Extraction for All uses (MCM)		80.93					
Provision for domestic and industrial requirement supply to 2025(MCM)		5.29					
Net Ground Water Availability for future irrigation development (MCM)		19.29					
Stage of Ground Water Development (%)		80.25					
Category		SEMI CRITICAL					
5.2 Aquifer-II - Semiconfined/Confined Aquifer (Basalt)							
Area (sq.km)	Mean thickness (m)	Piezometric head (meter above bottom of confining layer)	Sy	S	Resource above confining layer (mcm)	Resource in confining aquifer (mcm)	Total Resource (mcm)
1495.372	1.25 to 5	55 to 90	0.003	1.2E-05	10.29397	1.21085	11.5049
6.0. GROUND WATER RESOURCE ENHANCEMENT							
6.1 SUPPLY (MCM)							
Annual Extractable Ground Water Recharge (MCM)			100.84				
Current Annual Ground Water Extraction (MCM)			80.93				
Stage of Ground Water Extraction (%)			80.25				
DEMAND (MCM)							
Agricultural demand -GW			76.27				
Agricultural demand -SW			135.63				
Domestic demand - GW			4.66				
Domestic demand - SW			1.165				
Total Demand (MCM)			217.725				
SUPPLY (MCM)							
Agricultural Supply -GW			76.27				
Agricultural Supply -SW			135.63				
Domestic Supply - GW			4.66				
Domestic Supply - SW			1.165				
Total supply (MCM)			217.73				
6.2. Supply Side Management							
Rainwater Harvesting and Artificial Recharge							
Area feasible for recharge (sq. km.)			1481.68				
Unsaturated Volume (MCM)			2963.36				
Surplus water available for AR (MCM)			36.3				
Proposed Structures			Percolation Tank (@ Rs.150 lakh, Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)		Check Dam (@ Rs.30 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)		
Number of Structures			127		363		
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)			19.05		8.18		
Total recharged @ 75 % efficiency (MCM)			27.23				
Current Annual Resource Availability			100.84				

(MCM)	
Current Annual Groundwater Extraction (MCM)	80.93
Total GW resource available after supply side intervention (MCM)	128.07
Stage of GWD after supply side interventions (%)	63.19
Ground water available TO BRING STAGE OF GWD UPTO 70%	8.72



RTRWH - Urban Areas	May be implemented if Economically viable
Households to be covered (10% with 50 m ² considering roof top area)	7999
Total RWH potential (MCM)	0.23
Rainwater harvested / recharged @ 80% runoff co-efficient	0.18
Micro irrigation techniques	
Geographical Area (sq.km)	1522.5
Area proposed to be covered under drip (sq.km)	

Sugarcane	50
Onion	5
Volume of Water expected to be saved with drip irrigation (MCM)	
Sugarcane	28.5
Onion	1.3
Total Volume of Water expected to be saved (MCM)	29.8
Total GW Draft after Demand side intervention	51.13
Stage of GWD after demand side interventions (%)	39.92
GWR available/required to bring the STAGE OF GWD isto 70% (MCM)	38.52



7.0. EXPECTED BENEFITS

Annual Extractable Ground Water Recharge (MCM)	100.84
Current Annual Ground Water Extraction (MCM)	80.93
Water Recharged by Supply side intervention (MCM)	27.23
Water saving by demand side intervention (MCM)	29.8
Present Stage of Ground Water Extraction (%)	80.25
Ground water resources after supply side management (MCM)	128.07
Ground water Draft after demand	51.13

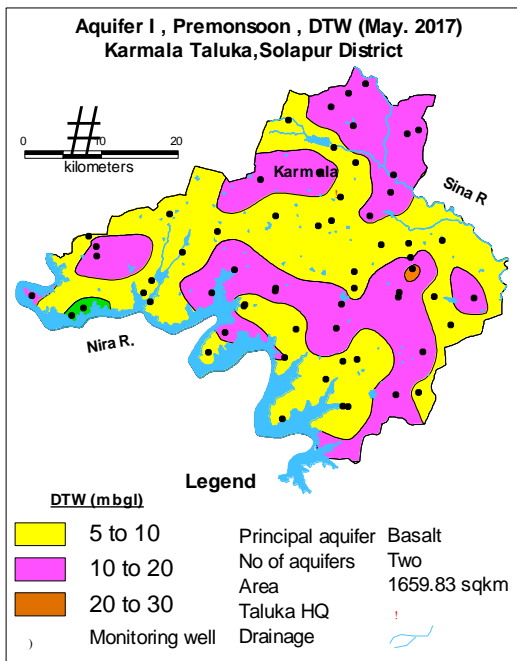
side management (MCM)	
Expected Stage of Ground Water Extraction after Supply and Demand side interventions (%)	39.92
8. DEVELOPMENT PLAN	
Volume of water available for GWD to enhance stage of GWD to 70% (MCM)	38.52
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	2311
Proposed Number of BW (@ 1.5 ham for 10% of GWR Available)	257
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	59.26

9.3 KARMALA TALUKA, SOLAPUR DISTRICT, MAHARASHTRA

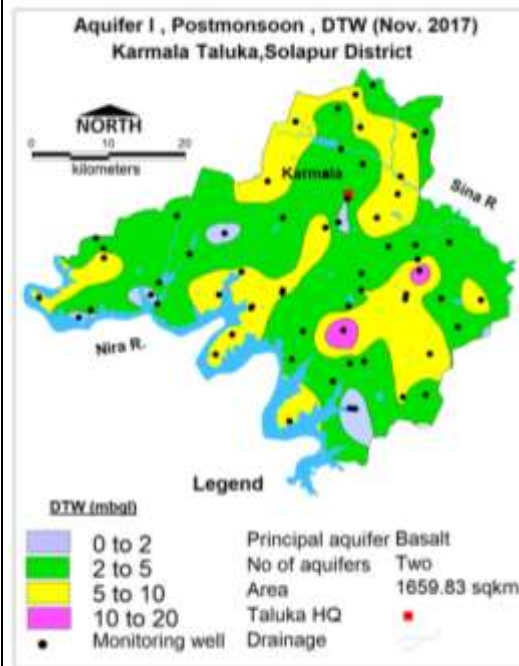
1. SALIENT INFORMATION	
1.1. Introduction	
Taluka Name	Karmala
Geographical Area (Sq. Km.)	1593.01
Hilly Area (Sq. Km)	0
Saline Area (Sq. Km.)	0
Population (2011)	254489
Climate	Tropical
1.2 Rainfall Analysis	
Annual Rainfall (2017) (mm)	568.3 mm
Decadal Average Annual Rainfall (2008-17) (mm)	544.7 mm
Normal Rainfall (mm)	577.5 mm
Long Term Rainfall Analysis (1901-2017)	Rising Trend 0.552 mm/year Normal/Excess Rainfall- 50% & 50%. (Moderate/Severe)-: 18 % Moderate & 10 % Severe. Probability of Probability of Drought
Rainfall Trend Analysis (1901 To 2017) EQUATION OF TREND LINE: $y = 0.5522x + 545.99$	
1.3. Geomorphology &Geology	
Geomorphic Unit	Undissected to highly Dissected plateau with weathered thickness ranging from 0 to 1 m.small patch faalls in command area.
Soil	In general, they are clayey loam in texture and fairly high in calcium carbonate, high porosity but low permeability, thus having low to moderate infiltration capacity. Based on physical characteristics the soils of the area have been classified into three major groups: Medium black soil, Red Sandy soils and Shallow black soils
Geology	Alluvium: sand/ silt and clay alternating beds Recent to Sub-recent Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene Age:
1.4. Hydrology & Drainage	
Hydrology	
Bigger Minor Irrigation Project (>100 Ha.)	Completed: -16 MI Tanks

Minor Irrigation Project (<100 Ha.)	Completed: -71 VT, 7 PT, 55 KT weirs & 46 DB
Drainage	The area is drain by Sina river, Nira rivers and its tributaries, flow from NW to SE direction, divide also in same direction.
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern	
Geographical Area (Sq. Km.)	1593.01
Forest Area (Sq. Km.)	59.48
Net Sown Area (Sq. Km.)	1185.3
Double Cropped Area (Sq. Km.)	29.79
Gross Cropped Area (sq.km)	1215.09
Cultivable Area (Sq. Km.)	1384.79
Area under Irrigation (Sq. Km.)	
Ground Water	164.42
Surface Water	46.65
Principal Crops	Area (Sq. Km.)(Reference year 2013-14)
Wheat	29.25
Jawar	1.51
Bajra	32.99
Maize	39.96
Tur	9.16
Sugarcane	46.11
Chilli	2.83
Mango	6.85
Onion	9.31
Sunflower	35.36
1.6. Water Level Behaviour	
1.6.1.Phreatic Aquifer-Water Level	
Pre-Monsoon (May-2017)- Water level less than 10 mbgl has been observed in major part of the taluka, while water level in the range of 10 to 20 mbgl is close to divide; deeper water level more than 20 mbgl has been observed at Sade village.	
Post-Monsoon (November-2017)- Water Level less than 10 mbgl has been observed in northern, north-western and southern parts of the Taluka while water level in the range of 10 to 20 mbgl is observed in at Lavhe and Sade villages.	

Post-Monsoon Water Level (Nov. 2016)



Post-Monsoon Water Level (Nov. 2016)

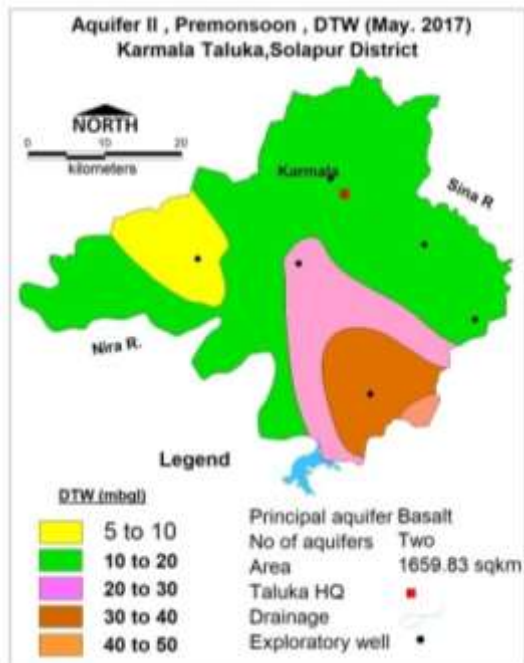


1.6.2. Semi-Confined/Confined Aquifer-Water Level

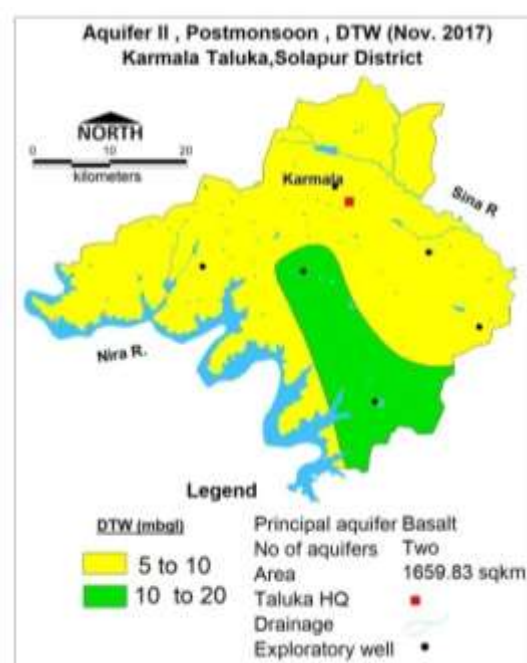
Pre-Monsoon (May-2016)- Water level < 20 mbgl is observed in south western part of the Taluka; water level > 20 mbgl is observed in southeastern part of the Taluka around Zare and Vadshivane villages.

Post-Monsoon (November-2017)- Water level < 10 mbgl is observed in south western part of the Taluka; water level > 20 mbgl is observed in southeastern part of the Taluka around Zare and Vadshivane villages.

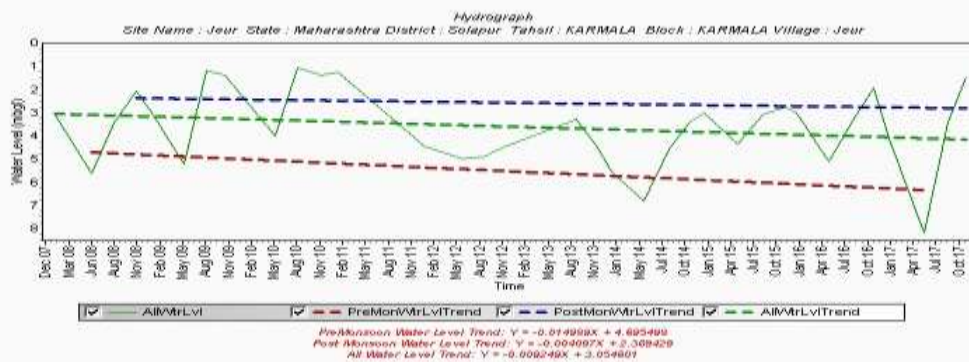
Pre-Monsoon Water Level (May 2017)



Post-Monsoon Water Level (Nov. 2017)



1.6.4. Hydrograph



Hydrograph shows Pre-monsoon rising trend @ 0.38 m/year

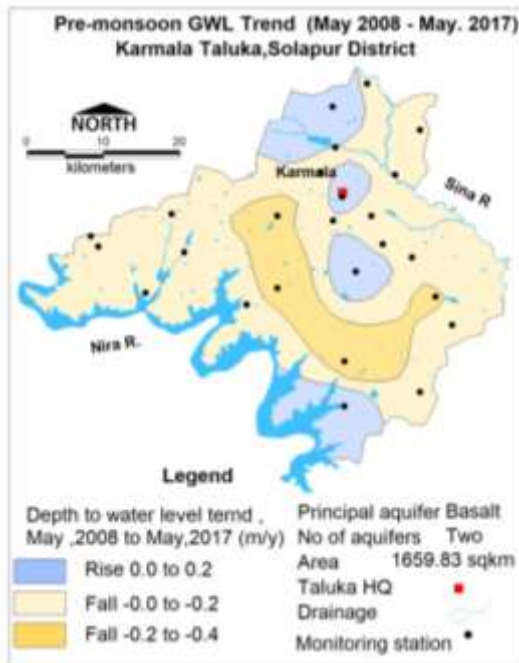
Hydrograph shows Post-monsoon rising trend @ 0.135 m/year

1.6.3. Water Level Trend (2008-2017)

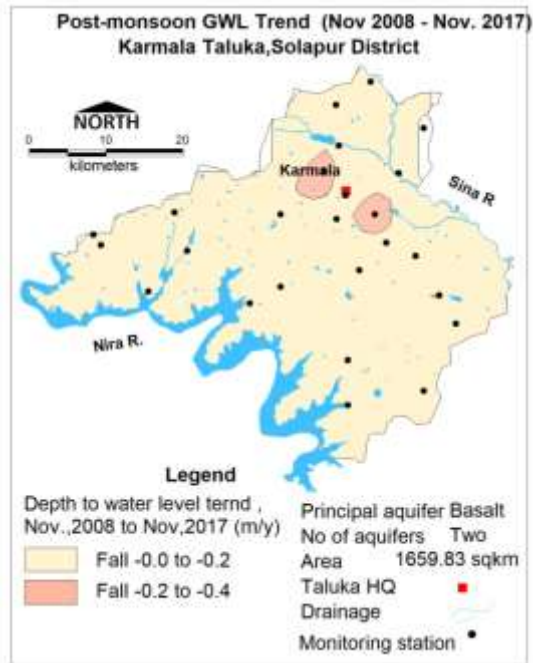
Pre-Monsoon trend
Rising 0.12 to 0.17 m/year
Falling 0.01 to 0.39 m/year
Declining trend up to 0.2 m/year is observed in almost entire Taluka; decline in water level >0.2 m/year has been observed in northern part of the Taluka. Rising water level trend has been observed in small part in northern and southern parts and isolated part in western part of the Taluka.

Post-Monsoon trend
Rising 0.03 m/year
Falling 0.001 to 0.398 m/year
Declining trend up to 0.2 m/year is observed in almost entire Taluka; significant decline in water level > 0.2 m/year has been observed in northern part of the Taluka.

Premonsoon Water level Trend (2007-17)



Postmonsoon Water level Trend (2007-17)



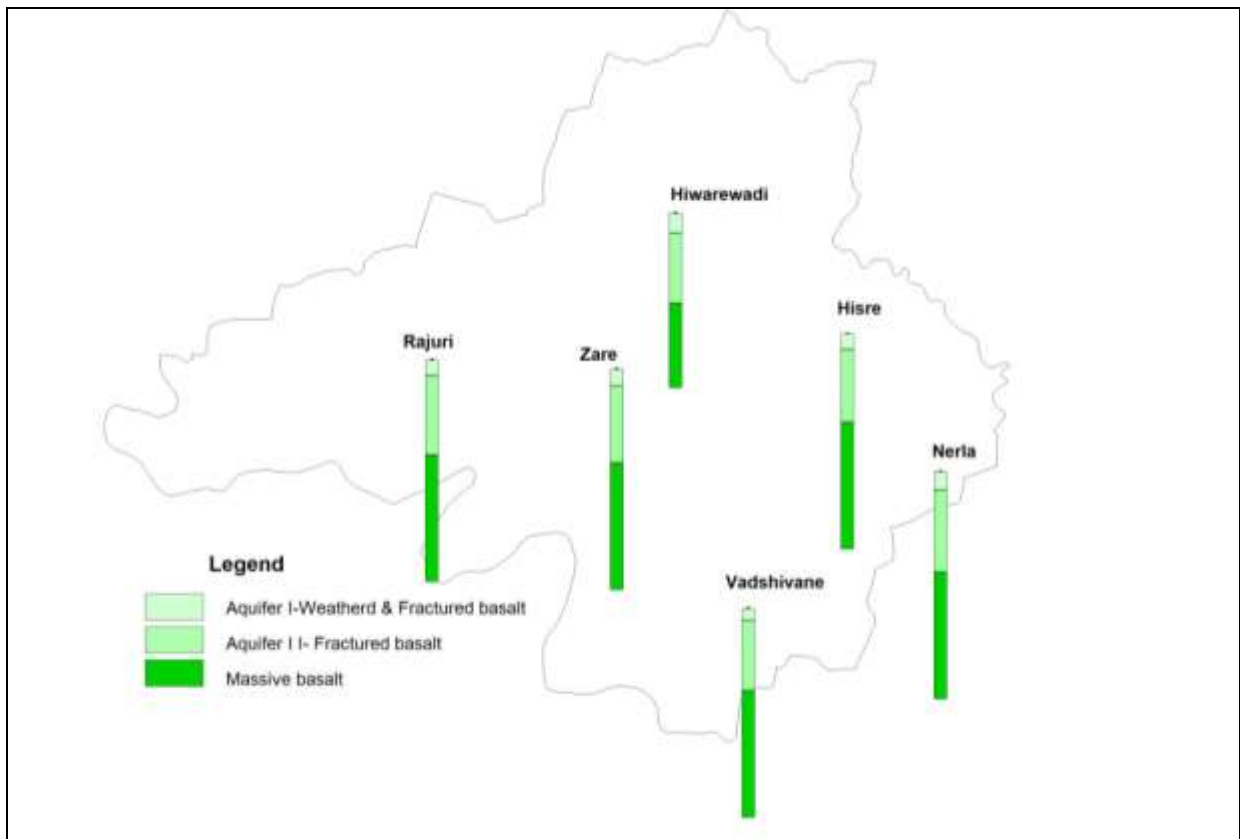
2. AQUIFER DISPOSITION

2.1. Number of Aquifers

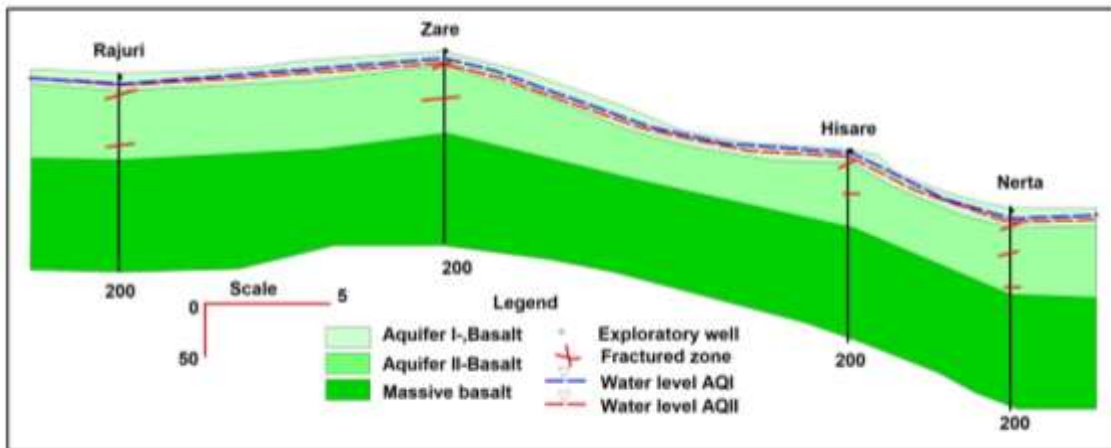
Aquifer-I Alluvium & Basalt

Aquifer-II - Basalt

2.2. Bar Diagram



2.3. Cross Sections



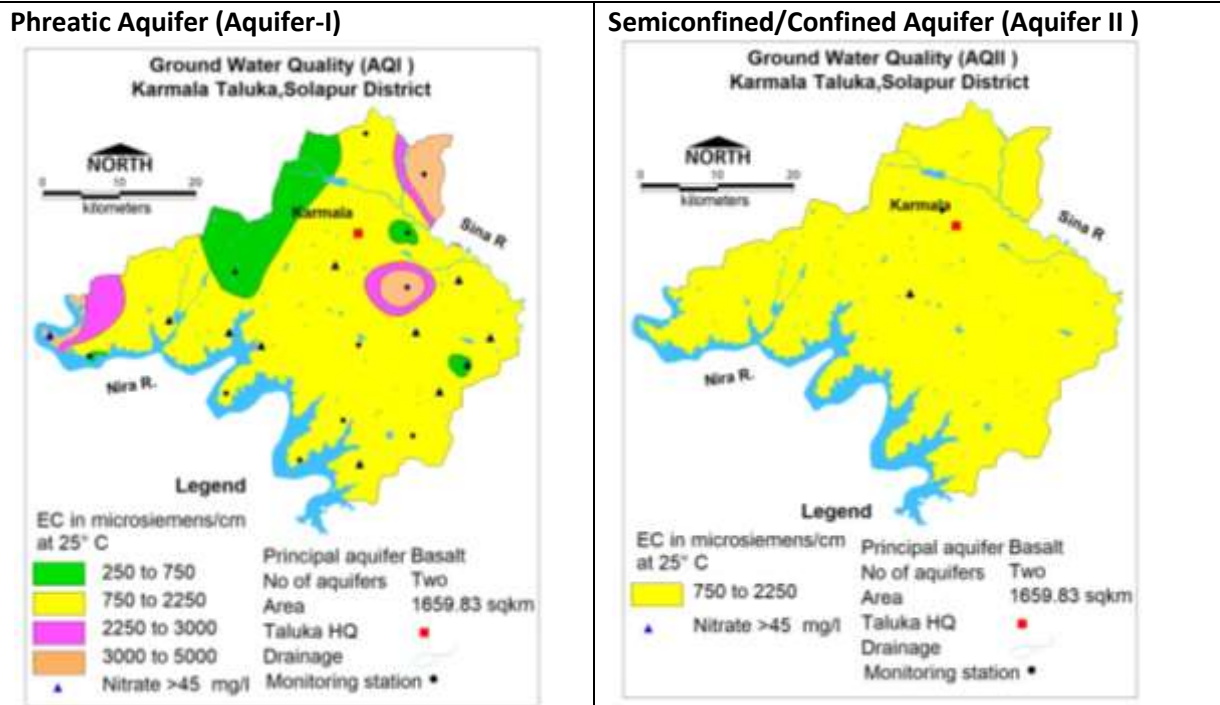
2.4. Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)	Basalt (Deccan Traps)
Type of Aquifer	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)
Depth of Occurrence (mbgl)	8 - 30	90 - 196
Thickness of wearherd/ fractured rocks (m)	5 - 15	1.25 - 5
Yield	10 - 100 m ³ /day	0-3 lps
Specific yield (Sy)	0.02	0.0025
Storativity (S)		0.0000154
Transmissivity (T) (m ² /day)	T: 5-20 m ² /day	T: 30-70 m ² /day

3. GROUND WATER QUALITY

3.1 Phreatic Aquifer (Aquifer-I): In general the water quality of shallow aquifer in Karmala taluka is potable and good for drinking, domestic, industrial as well as irrigation purposes. Nitrate more than 45 mg per litre was detected in water sample from Hivare,Sade,Deolali,Sogaon,Parewadi,Kedgaon,Nerle,Varkute and Pathurdi. very high salinity prevails (>2250 $\mu\text{S}/\text{cm}$), which is not suitable for drinking, domestic, industrial as well as irrigation purposes. Ground water can be used for drinking only after treatment and for irrigation for very high salt tolerant crops and with proper soil and crop management practices.

3.1 Deeper Aquifer (Aquifer-II): In general the water quality of deep aquifer in Karmala taluka is potable and very good for drinking, domestic, industrial as well as irrigation purposes. Nitrate more than 45 mg per litre was detected in water sample from Zarei EW & Fluorid more than 1.5 mg per litre was detected in water sample from Hiwarewadi EW. .



4. GROUND WATER ISSUES

Over - Exploitation Declining WL
 Limited Aquifer Potential
 Water Scarcity - lean period

5. GROUND WATER RESOURCE & EXTRACTION

5.1. Aquifer-I/ Phreatic Aquifer (Basalt & Alluvium)

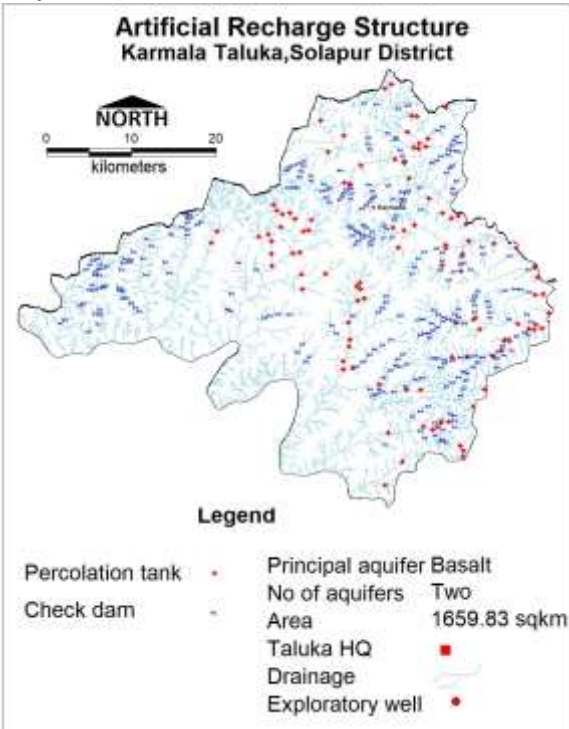
Ground Water Recharge Worthy Area (Sq. Km.)	1659.83
Total Annual Ground Water Recharge (MCM)	121.47
Natural Discharge (MCM)	6.07
Annual Extractable Ground Water Recharge (MCM)	115.40
Current Annual Ground Water Extraction for irrigation (MCM)	79.47
Existing Gross Ground Water Draft for domestic and industrial water supply(MCM)	3.78
Current Annual Ground Water Extraction for All uses(MCM)	83.25
Provision for domestic and industrial requirement supply to 2025(MCM)	4.21
Net Ground Water Availability for future irrigation development(MCM)	33.06
Stage of Ground Water Extraction (%)	72.14

Category	Semi Critical
5.2 Aquifer-II	Semiconfined/Confined Aquifer (Basalt)

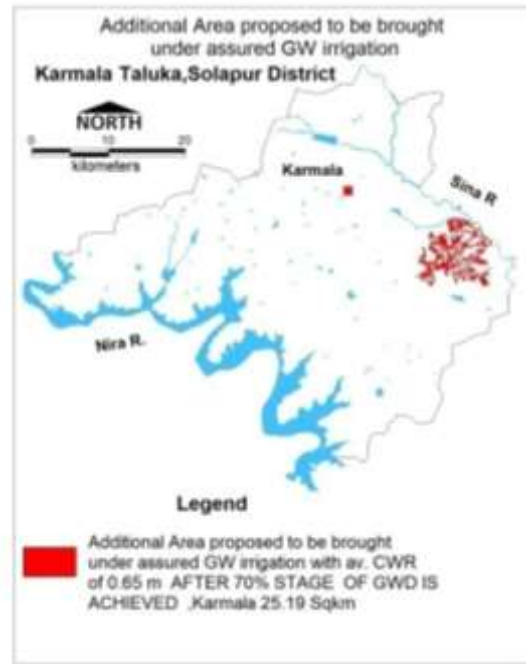
Area (sq.km)	Mean thickness (m)	Piezometric head (meter above bottom of confining layer)	Sy	S	Resource above confining layer (mcm)	Resource in confining aquifer (mcm)	Total Resource (mcm)
1602.382	2.5	65	0.00232	1.45E-05	1.510245	9.293816	10.80406
6.0. GROUND WATER RESOURCE ENHANCEMENT							
6.1 SUPPLY (MCM)							
Annual Extractable Ground Water Recharge (MCM)		115.4					
Current Annual Ground Water Extraction (MCM)		83.25					
Agricultural Supply -GW		79.47					
Agricultural Supply -SW		71.77					
Domestic Supply - GW		3.78					
Domestic Supply - SW		0.94					
Total Supply		169.15					
6.2. Supply Side Management							
Area of Taluka (Sq. Km.)		1659.83					
Area suitable for Artificial recharge(Sq. Km)		1229.39					
Type of Aquifer		Hard Rock					
Area feasible for Artificial Recharge(WL >5mbgl) (Sq. Km.)		1229.39					
Volume of Unsaturated Zone (MCM)		2458.78					
Average Specific Yield		0.02					
Volume of Sub surface Storage Space available for Artificial Recharge (MCM)		49.1756					
Surplus water required (MCM)		65.403548					
Surplus water Available (MCM)		30.12					
Proposed Structures		Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)			Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)		
Number of Structures		105			301		
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)		15.79			6.8		
Proposed Structures							
Area of Saline Patch		0					
No. of farm ponds		0					
Volume of water available		0					

for harvesting		
No of waterbody in saline patch (Area more than 2.5 ha)	Nil	
Additional volume created by desilting	Nil	
RTRWH Structures – Urban Areas		
Households to be covered (25% with 50 m ² area)	13,430.00	
Total RWH potential (MCM)	0.37	
Rainwater harvested / recharged @ 80% runoff coefficient	0.29	May be implemented if Economically viable
6.3. Demand Side Management		
Micro irrigation techniques		
Sugarcane crop area (33.04), about 20 sq.km area is ground water irrigated ,100 % ground water irrigated (20 sq.km) proposed to be covered under Drip (sq.km.)		2
Volume of Water expected to be saved (MCM). Surface Flooding req- 2.45 m. Drip Req. - 1.88, WUE- 0.57 m		1.14
Area proposed to be covered (37.78sq.km.) 50% Onion area		0
Volume of Water expected to be conserved (MCM). Onion requirement - 0.78 m, Drip - 0.52 m,		0
Area proposed to be covered (37.78sq.km.) 50% double crop area		0
Volume of Water expected to be conserved (MCM). Onion requirement - 0.9 m, Drip - 0.5 m,		0
Proposed Cropping Pattern change		
Irrigated area under Water Intensive Crop (ha)		Not proposed
Water Saving by Change in Cropping Pattern		Nil
7.0. Expected Benefits		
Net Ground Water Availability (MCM)		115.40
Additional GW resources available after Supply side interventions (MCM)		22.52
Ground Water Availability after Supply side intervention		159.52
Existing Ground Water Draft for All Purposes (MCM)		83.25
GW draft after Demand Side Interventions (MCM)		82.11
Present stage of Ground Water Development (%)		72.14
Expected Stage of Ground Water Development after interventions (%)		59.53
Other Interventions Proposed, if any		
Alternate Water Sources Available		Nil
Recommendation		
Ground water development is recommended to bring the stage of ground water development from 59.53 % to 70%		
8. Development Plan		
Volume of water available for GWD to enhance stage of GWD to 70% (MCM)		14.48
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)		869
Proposed Number of BW (@ 1.5 ham for 10% of GWR Available)		97
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m		22.27

Proposed AR Structures



Additional area proposed to be bought under assured GW irrigation

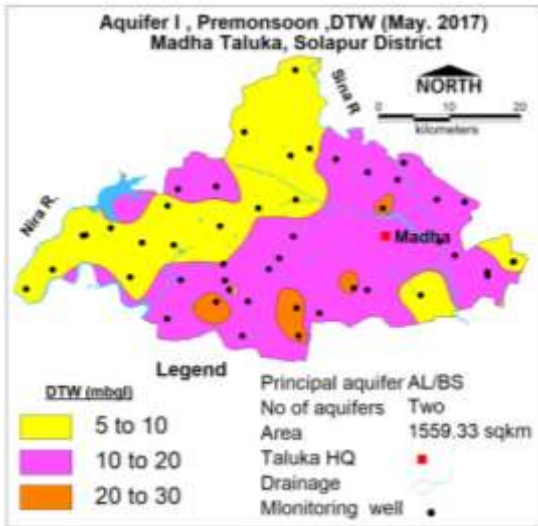


9.4 MADHA TALUKA, SOLAPUR DISTRICT, MAHARASHTRA

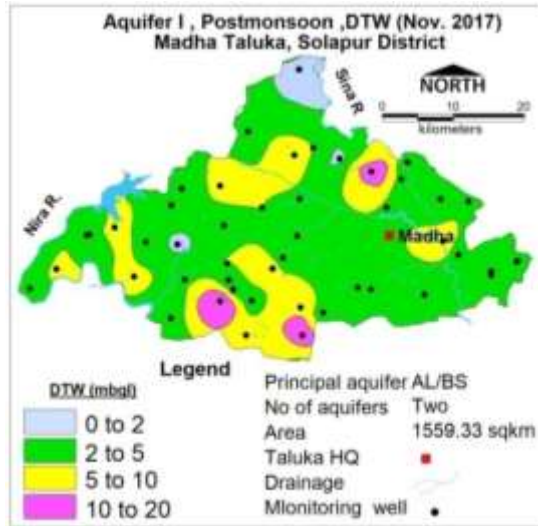
1. SALIENT INFORMATION	
1.1. Introduction	
Taluka Name	Madha
Geographical Area (Sq. Km.)	1523.9
Hilly Area (Sq. Km)	0.00
Saline Area (Sq. Km.)	0.00
Population (2011)	324027
Climate	Tropical
1.2 Rainfall Analysis	
Annual Rainfall (2017) (mm)	617.8 mm
Decadal Average Annual Rainfall (2007-17) (mm)	595.5 mm
Normal Rainfall (mm)	497.2 mm
Long Term Rainfall Analysis (1901-2017)	Rising Trend 0.346 mm/year Normal/Excess Rainfall-48% & 52%. Probability of Drought (Moderate/Severe)-: 21 % Moderate & 1 % Severe and Acute 1%. Probability of
Rainfall Trend Analysis (1901 To 2017) EQUATION OF TREND LINE: $y = 0.3461x + 577.52$	
1.3. Geomorphology & Geology	
Geomorphic Unit	Alluvial Plain of Sina River and Plateau , Undissected to Moderately Dissected (PLM) with weathered thickness ranging from 0 to 1 m.
Soil	In general they are clayey loam in texture and fairly high in calcium carbonate, high porosity but moderate to low permeability, thus having low to moderate infiltration capacity. Based on physical characteristics the soils of the area have been classified into three major groups: Medium black soil, Red Sandy soils and Shallow black soils
Geology	Alluvium: sand/ silt and clay alternating beds Age: Recent to Sub-recent

	Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene
1.4. Hydrology & Drainage	
Hydrology	
Bigger Minor Irrigation Project (>100 Ha.)	Completed: -1 major & 15 MI Tanks
Minor Irrigation Project (<100 Ha.)	Completed: -82 VT, 7 PT, 62 KT weirs & 71 DB
Drainage	The area is drain by Sina river, Nira rivers and its tributaries, flow from NW to SE direction, divide also in same direction.
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern	
Geographical Area (Sq. Km.)	1523.9
Forest Area (Sq. Km.)	25.84
Net Sown Area (Sq. Km.)	1086.58
Double Cropped Area (Sq. Km.)	59.64
Gross Cropped Area (sq.km)	1146.22
Cultivable Area (Sq. Km.)	1455.68
Area under Irrigation (Sq. Km.)	
Ground Water	223.73
Surface Water	192.16
Principal Crops	Area (Sq.km.) (Reference year 2013-14)
Wheat	70.02
Jawar	3.15
Bajra	22.05
Maize	20.73
Tur	12.5
Sugarcane	43.95
Chilli	4.82
Mango	3.58
Onion	9.5
Sunflower	25.07
1.6. Water Level Behaviour	
1.6.1. Phreatic Aquifer-Water Level	
Pre-Monsoon (May-2017)- Water level less than 10 mbgl has been observed in northern and western parts of the Taluka while water level in the range of 10 to 20 mbgl is observed in major part of the Taluka; deeper water level more than 20 mbgl has been observed in isolated patch in south eastern parts.	
Post-Monsoon (November-2017)- Water Level less than 5 mbgl has been observed in northern, north-western and southern parts of the Taluka while water level in the range of 5 to 10 mbgl is observed in as isolated patch of the Taluka; deeper water level more than 10 mbgl has been observed at Paritewadi and Mhaisgaon.	

Pre-Monsoon Water Level (May 2017)



Post-Monsoon Water Level (Nov. 2016)

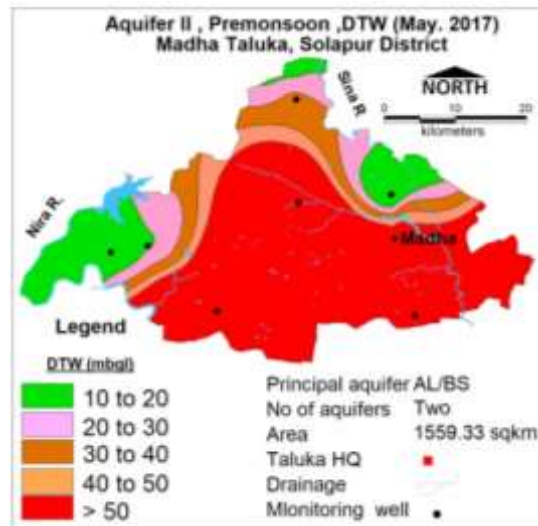


1.6.2. Semi-Confined/Confined Aquifer-Water Level

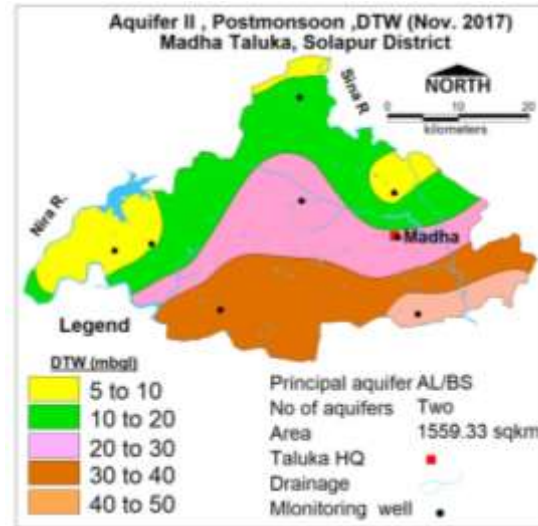
Pre-Monsoon (May-2016)- Water level > 50 mbgl is observed in major part of the Taluka; shallow water level is observed in northern part of the Taluka

Post-Monsoon (November-2017)- Water level >20 mbgl is observed in north eastern and south-western parts of the Taluka; while 10 to 20 mbgl is observed in north western part of the Taluka.

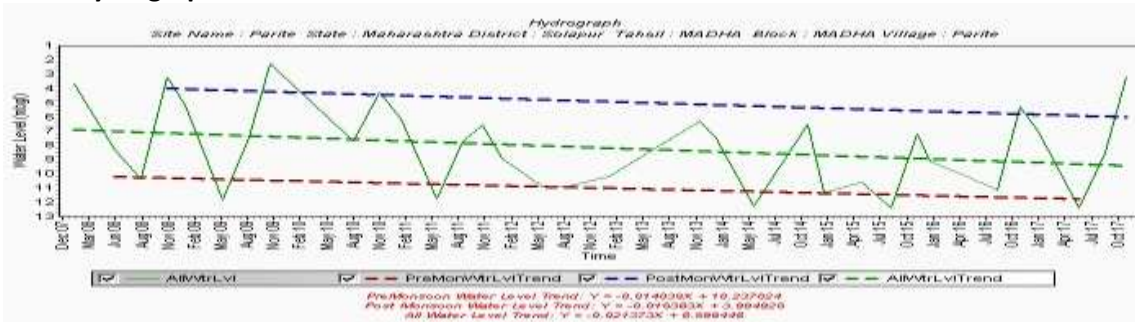
Pre-Monsoon Water Level (May 2017)



Post-Monsoon Water Level (Nov. 2017)



1.6.4. Hydrograph

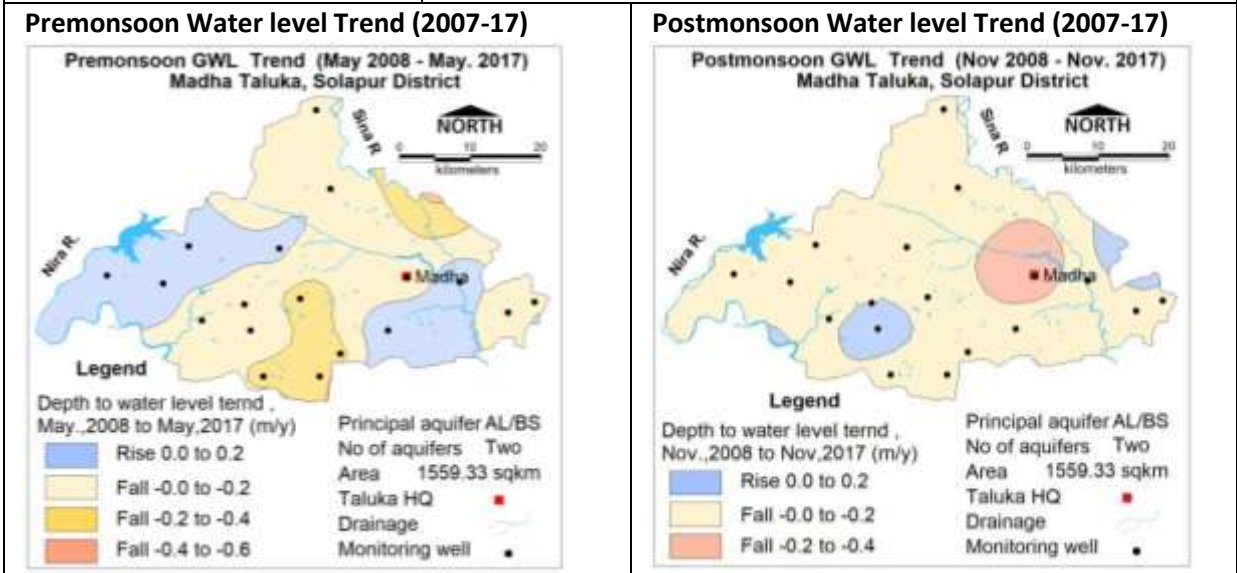


Hydrograph shows Pre-monsoon rising trend @ 0.38 m/year

Hydrograph shows Post-monsoon rising trend @ 0.135 m/year

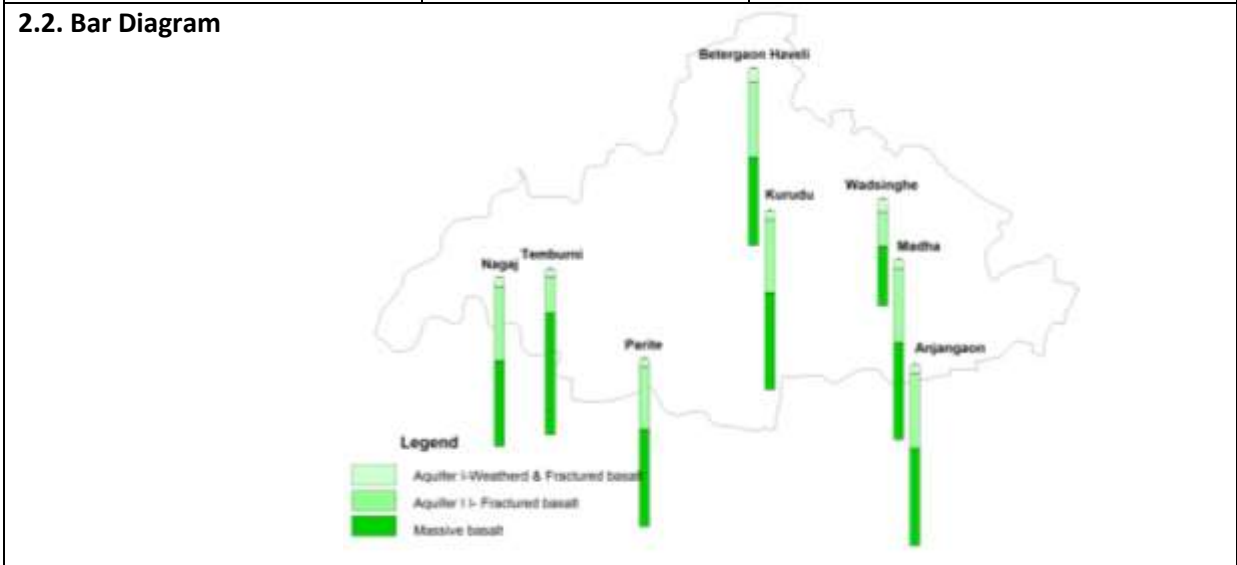
1.6.3. Water Level Trend (2008-2017)

Pre-Monsoon trend	Rising 0.0129 to 0.144m/year
	Falling 0.008 to 0.55 m/year
	Declining trend up to 0.2 m/year is observed in major part of the Taluka; decline in water level >0.2 m/year has been observed in eastern part of the Taluka. Rising water level trend has been observed in small part in northern and southern parts and isolated part in western part of the Taluka.
Post-Monsoon trend	Rising 0.19 m/year
	Falling 0.001 to 0.38 m/year
	Declining trend up to 0.2 m/year is observed in almost entire Taluka; significant decline in water level > 0.2 m/year has been observed around Madha town. Rising water level trend has been observed in southern part and in isolated parts in western part of the Taluka.

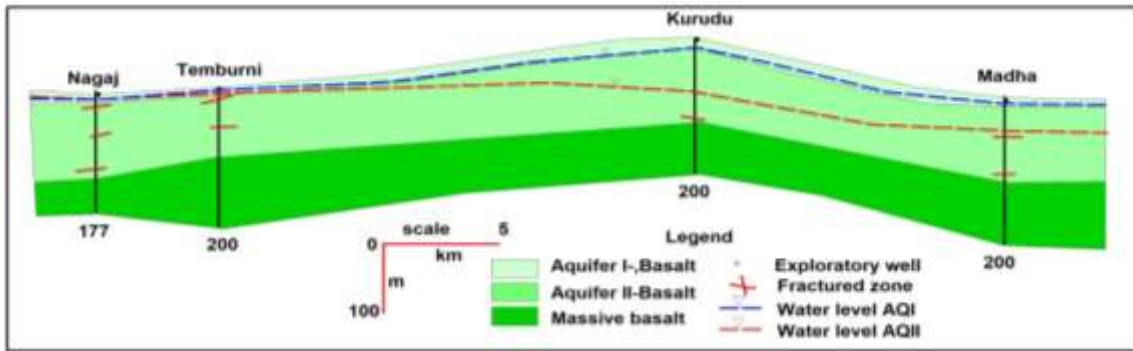


2. AQUIFER DISPOSITION

2.1. Number of Aquifers	Alluvium-Aquifer-I	Basalt –Aquifer-I, Aquifer-II
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2.3. Cross Sections



2.4. Aquifer Characteristics

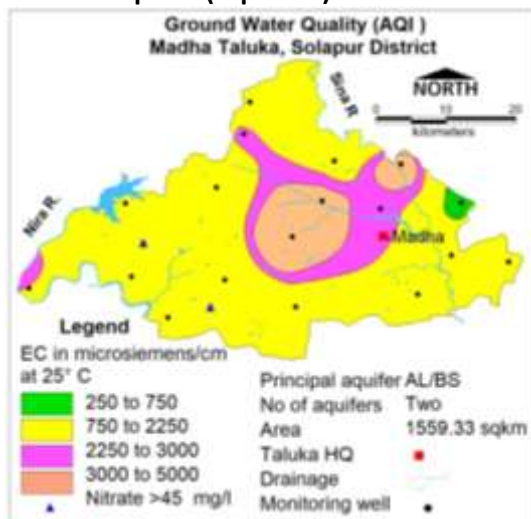
Major Aquifers	Basalt (Deccan Traps)	
Type of Aquifer	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)
Depth of Occurrence (mbgl)	8 - 30	50 - 196
Thickness of weathered/fractured rocks (m)	5 - 15	1.25 - 7
Yield	10 - 100 m ³ /day	0.1-1.5 lps
Specific yield (Sy)	0.02	0.0025
Storativity (S)		0.0000154
Transmissivity (T) (m ² /day)	T: 10-25 m ² /day	T: 30-40 m ² /day

3. GROUND WATER QUALITY

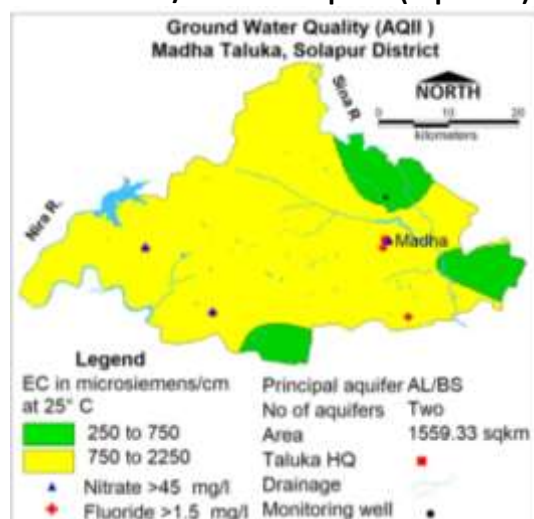
3.1 Phreatic Aquifer (Aquifer-I) In general the water quality of shallow aquifer in Madha taluka is potable and good for drinking, domestic, industrial as well as irrigation purposes. Nitrate more than 45 mg per litre was detected in water sample from Ghoti, Laul, Manegaon, Anjangaon, Akulgaon, Badalewadi, Shiral Tembhurni, very high salinity prevails (>2250 μ S/cm), which is not suitable for drinking, domestic, industrial as well as irrigation purposes. Ground water can be used for drinking only after treatment and for irrigation for very high salt tolerant crops and with proper soil and crop management practices.

3.2: Semiconfined/Confined Aquifer (Aquifer II) In general the water quality of deep aquifer in Madha taluka is potable and very good for drinking, domestic, industrial as well as irrigation purposes. Nitrate more than 45 mg per litre was detected in water sample from Madha, Tembhurni & Parite EW and Fluoride more than 1.5 mg per litre was detected in water sample from Madha EW.

Phreatic Aquifer (Aquifer-I)



Semiconfined/Confined Aquifer (Aquifer II)



4 GROUND WATER ISSUE	Over - Exploitation Declining WL Limited Aquifer Potential Water Scarcity - lean period						
5. GROUND WATER RESOURCE & EXTRACTION							
5.1. Aquifer-I/ Phreatic Aquifer (Basalt & Alluvium)							
Ground Water Recharge Worthy Area (Sq. Km.)							1559.33
Total Annual Ground Water Recharge (MCM)							165.15
Natural Discharge (MCM)							8.51
Net Annual Ground Water Availability (Annual Extractable Ground Water Recharge)							156.64
Current Annual Ground Water Extraction for irrigation (MCM)							123.17
Current Annual Ground Water Extraction for domestic and industrial water supply (MCM)							5.15
Current Annual Ground Water Extraction for All uses (MCM)							128.32
Annual GW Allocation for Domestic Use as on 2025 (MCM)							5.71
Net Ground Water Availability for future irrigation development (MCM)							44.01
Stage of Ground Water Development (%)							81.92
Category							Semi Critical
5.2 Aquifer-II Semiconfined/Confined Aquifer (Basalt)							
Area	Mean thickness (m)	Piezometric head (meter above bottom of confining layer)	Sy	S	Resource above confining layer (mcm)	Resource in confining aquifer (mcm)	Total Resource (mcm)
1511.892	3	64	0.002	1.45E-05	1.403035	9.071349	10.47438
6.0. GROUND WATER RESOURCE ENHANCEMENT							
6.1 SUPPLY (MCM)							
Net Available Resource (MCM)			156.64				
Gross Annual Draft (MCM)			128.32				
Agricultural Supply -GW			204.47				
Agricultural Supply -SW			-				
Domestic Supply - GW			6.14				
Domestic Supply - SW			1.53				
Total Supply			212.14				
6.2. Supply Side Management							
Area of Taluka (Sq. Km.)			1559.33				
Area suitable for Artificial recharge(Sq. Km)			1484.36				
Type of Aquifer			Hard Rock				
Area feasible for Artificial Recharge(WL >5mbgl) (Sq. Km.)			1484.36				
Volume of Unsaturated Zone (MCM)			2968.72				
Average Specific Yield			0.02				
Volume of Sub surface Storage Space available for Artificial			59.37				

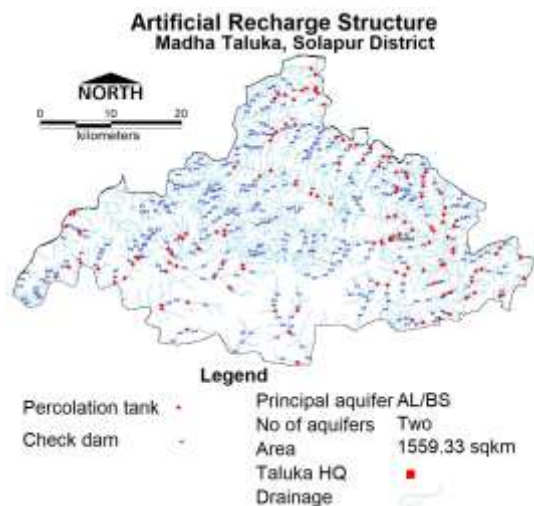
Recharge (MCM)		
Surplus water required (MCM)	78.97	
Surplus water Available (MCM)	36.37	
Proposed Structures	Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures	127	364
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	19.08	8.19
Total recharged @ 75 % efficiency (MCM)	27.27	
Current Annual Resource Availability (MCM)	156.64	
Current Annual Groundwater Extraction (MCM)	128.32	
Total GW resource available after supply side intervention (MCM)	183.91	
Stage of GWD after supply side interventions (%)	69.77	
Ground water available TO BRING STAGE OF GWD UPTO 70%	0.42	
RTRWH Structures – Urban Areas		
Households to be covered (25% with 50 m2area)	81006.00	
Total RWH potential (MCM)	2.41	
Rainwater harvested / recharged @ 80% runoff co-efficient	1.93	May be implemented if economically viable
6.3. Demand Side Management		
Micro irrigation techniques - Area proposed to be covered under drip (sq.km)		
Sugarcane		2
Onion		0
Volume of Water expected to be saved with drip irrigation (MCM)		
Sugarcane		1.14
Onion		0
Total Volume of Water expected to be saved (MCM)		1.14
Total GW Draft after Demand side intervention		127.18
Stage of GWD after demand side interventions (%)		69.15
GWR available/required to bring the stage of GWD to 70% (MCM)		1.56
Additional Area (sq.km.) proposed to be brought under assured GW irrigation		2.4
Proposed Cropping Pattern change		
Irrigated area under Water Intensive Crop(ha)		Not proposed
Water Saving by Change in Cropping Pattern		Nil
7.0. Expected Benefits		

Annual Extractable Ground Water Recharge (MCM)	156.64
Current Annual Ground Water Extraction (MCM)	128.32
Water Recharged by Supply side intervention (MCM)	27.27
Water saving by demand side intervention (MCM)	1.14
Present Stage of Ground Water Extraction (%)	81.92
Ground water resources after supply side management (MCM)	183.91
Ground water Draft after demand side management (MCM)	127.18
Expected Stage of Ground Water Extraction after Supply and Demand side interventions (%)	69.15
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil

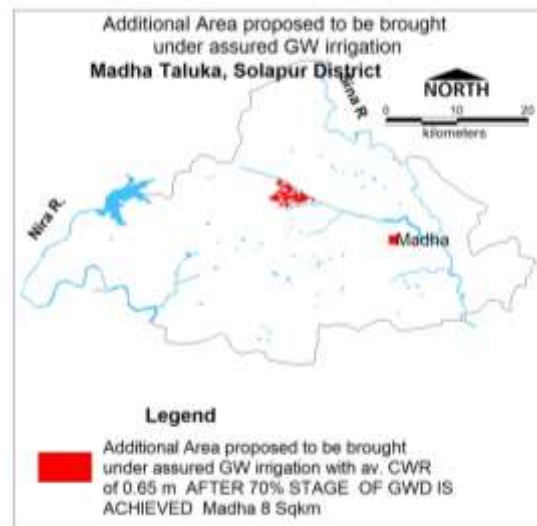
8. DEVELOPMENT PLAN

GW Resources Available for Development and Bring Stage of GWD upto 70% from present SOD (MCM)	1.56
Proposed no. of DW (@ 1.5 ham for 90% of GWR Available)	94
Proposed no. of BW* (@ 1.5 ham for 10% of GWR Available)	10
Additional Area (sq.km.) proposed to be brought under assured Ground Water irrigation with av. CWR of 0.65 m with 70% Stage of GW Extraction	2.4

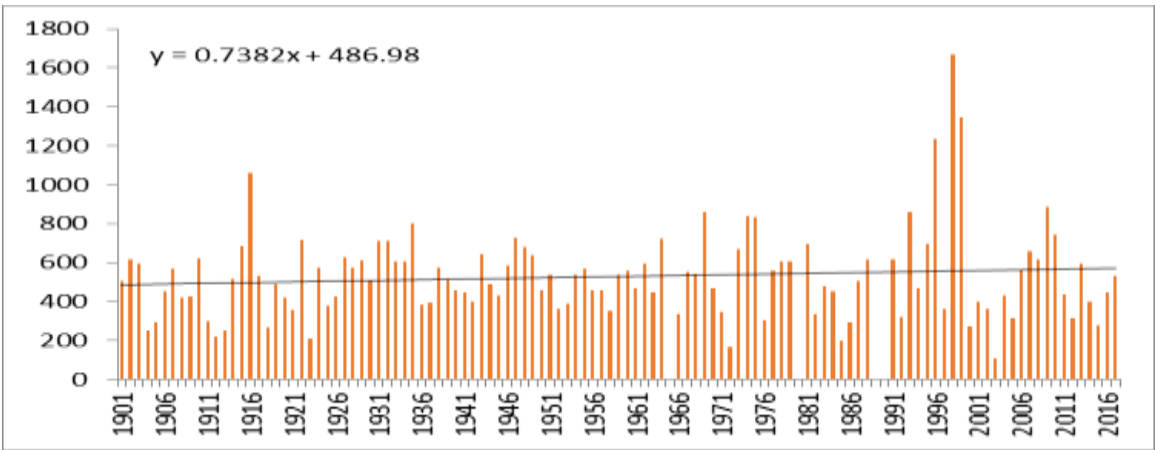
Proposed AR Structures



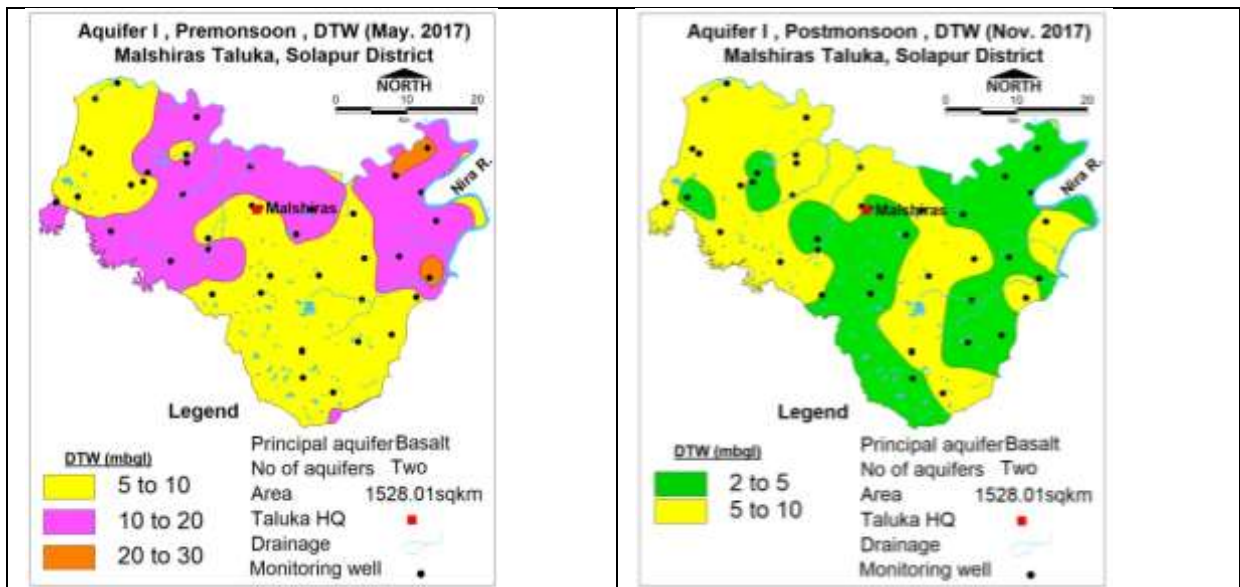
Additional area proposed to be bought under assured GW irrigation



9.5 MALSHIRAS TALUKA, SOLAPUR DISTRICT, MAHARASHTRA

1. SALIENT INFORMATION	
1.1. introduction	
Taluka Name	Malshiras
Geographical Area (Sq. Km.)	1607.98
Hilly Area (Sq. Km)	35.02
Saline Area (Sq. Km.)	0
Population (2011)	485645
Climate	Tropical
1.2 Rainfall Analysis	
Annual Rainfall (2017) (mm)	530.9 mm
Decadal Average Annual Rainfall (2007-17) (mm)	524.9 mm
Normal Rainfall (mm)	530 mm
Long Term Rainfall Analysis (1901-2017)	Rising Trend 0.738 mm/year Normal/Excess Rainfall: 54% & 19%. Drought (Moderate/Severe)-: 21 % Moderate & 5% Severe and 1 % Acute. Probability of Probability of
	
Rainfall Trend Analysis (1901 To 2017) EQUATION OF TREND LINE: $y = 0.7382x + 486.98$	
1.3. Geomorphology &Geology	
Geomorphic Unit	Plateau Undissected to highly Dissected, Plateau Weathered-Canal Command (PLC). with weathered thickness ranging from 0 to 2 m.
Soil	In general, they are clayey loam in texture and fairly high in calcium carbonate, high porosity but moderate to low permeability, thus having low to moderate infiltration capacity. Based on physical characteristics the soils of the area have been classified into three major groups: Medium black soil, Red Sandy soils and Shallow black soils
Geology	Alluvium: sand/ silt and clay alternating beds Recent to Sub-recent Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene Age:
1.4. Hydrology & Drainage	
Hydrology	

Bigger Minor Irrigation Project (>100 Ha.)	Completed: -3 MI Tanks
Minor Irrigation Project (<100 Ha.)	Completed: -98 VT, 7 PT, 81KT weirs & 80 DB
Drainage	The area is drain by Nira rivers and its tributaries, flow from NW to SE direction, drainage density high in southern boundary of taluka.
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern	
Geographical Area (Sq. Km.)	1607.98
Forest Area (Sq. Km.)	3.44
Net Sown Area (Sq. Km.)	942.27
Double Cropped Area (Sq. Km.)	40.33
Gross Cropped Area (sq.km)	982.6
Cultivable Area (Sq. Km.)	1579.98
Area under Irrigation (Sq. Km.)	
Ground Water	314.8
Surface Water	260.51
Principal Crops	Area (Sq. Km.) (Reference year 2013-14)
Wheat	61.7
Jawar	7.28
Bajra	42.74
Maize	20.7
Tur	11.03
Sugarcane	99.65
Chilli	1.13
Mango	3.79
Onion	9.97
Sunflower	38.34
1.6. Water Level Behaviour	
1.6.1. Phreatic Aquifer-Water Level	
Pre-Monsoon (May-2017)- Water level less than 10 mbgl has been observed in major part of the taluka, while water level in the range of 10 to 20 mbgl is close to divide in southern parts and central part; deeper water level more than 20 mbgl has been observed at Dasur and Sangam village.	
Post-Monsoon (November-2017)- Water Level less than 5 mbgl has been observed in north-eastern and southern parts of the Taluka while water level in the range of 5 to 10 mbgl is observed in major part of the Taluka.	
Pre-Monsoon Water Level (May 2017)	Post-Monsoon Water Level (Nov. 2016)

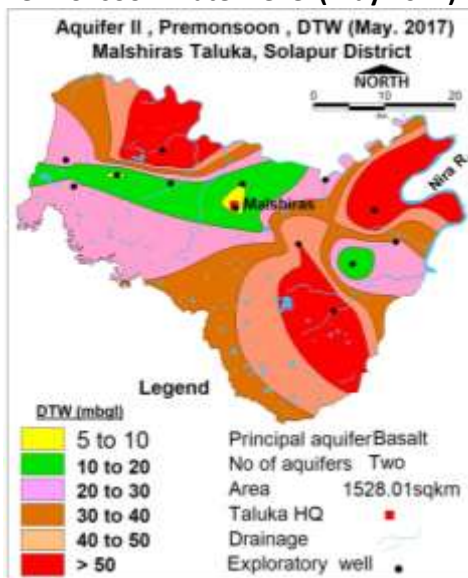


1.6.2. Semi-Confined/Confined Aquifer-Water Level

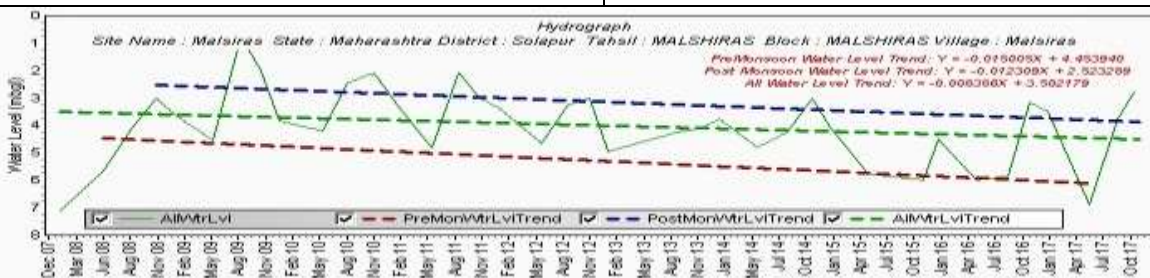
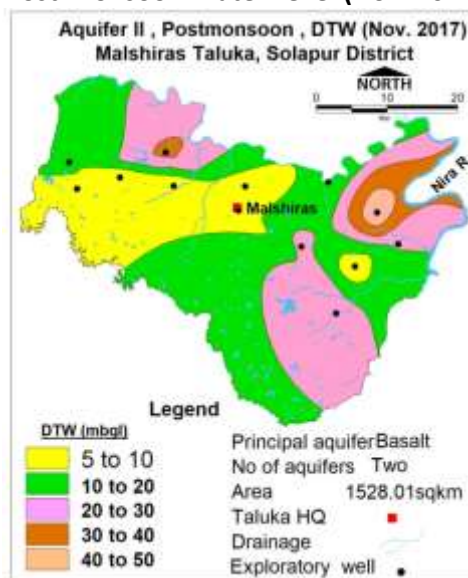
Pre-Monsoon (May-2016)- Water level > 20 mbgl is observed in major part of the Taluka; water level in the range of 10 to 20 mbgl is observed in central part of the Taluka

Post-Monsoon (November-2017)- Water level <10 mbgl is observed in north eastern and south-western parts of the Taluka; >10 mbgl is observed in major part of the Taluka

Pre-Monsoon Water Level (May 2017)



Post-Monsoon Water Level (Nov. 2017)



1.6.4. Hydrograph

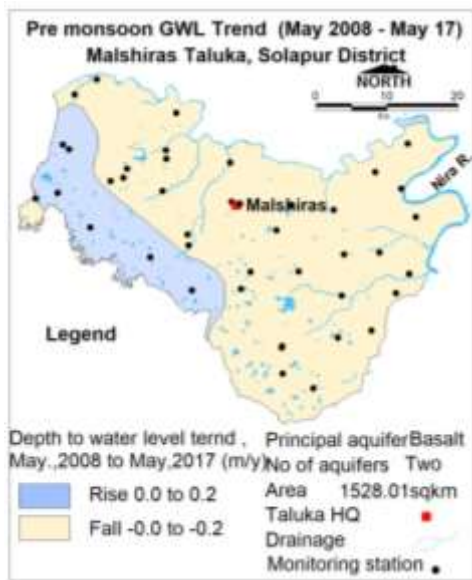
Hydrograph shows Pre-monsoon rising trend @ 0.38 m/year

Hydrograph shows Post-monsoon rising trend @ 0.135 m/year

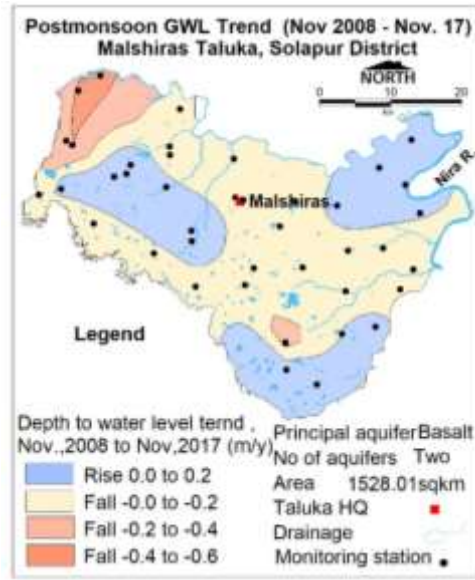
1.6.3. Water Level Trend (2008-2017)

Pre-Monsoon trend	Rising 0.01 to 0.12 m/year
	Falling 0.009 to 0.14 m/year
	Declining trend up to 0.2 m/year is observed in almost entire Taluka; Rising water level trend has been observed in small part in southern parts of the Taluka.
Post-Monsoon trend	Rising 0.009 to 0.18 m/year
	Falling 0.02 to 0.42 m/year
	Declining trend up to 0.2 m/year is observed in major part of the Taluka; significant decline in water level > 0.2 m/year has been observed in eastern part of the Taluka. Rising water level trend has been observed in southern part and in isolated parts in western part of the Taluka.

Premonsoon Water level Trend (2007-17)



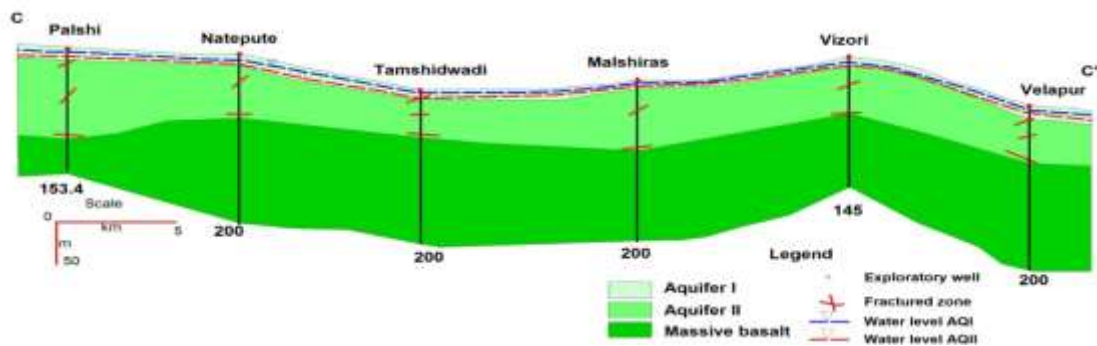
Postmonsoon Water level Trend (2007-17)



2. AQUIFER DISPOSITION

2.1. Number of Aquifers	Aquifer-I -Basalt, Alluvium
	Aquifer-II -Basalt

2.2 Cross Section



2.2. Bar Diagram



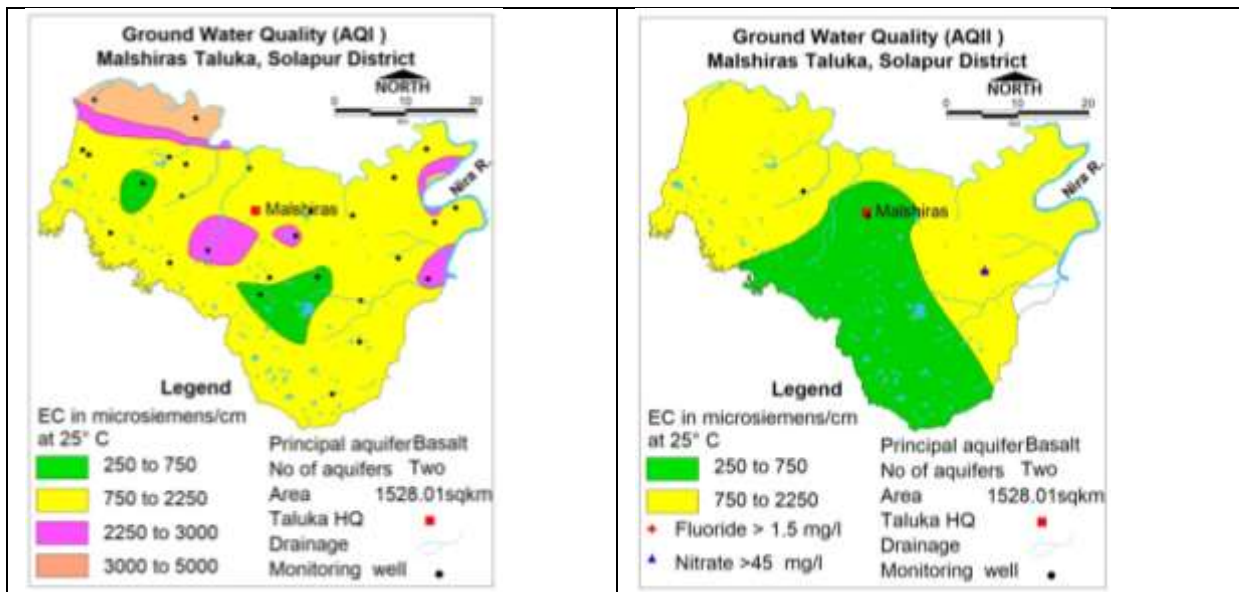
2.4. Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)	Basalt (Deccan Traps)
Type of Aquifer	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)
Depth of Occurrence (mbgl)	8 - 30	90 - 196
Thickness of weathered/fractured rocks (m)	5 - 15	1.25 - 5
Yield	10 - 100 m ³ /day	0.1 - 0.7 lps
Specific yield (Sy)	0.02	0.005
Storativity (S)		0.00057
Transmissivity (T) (m ² /day)	T: 20-25 m ² /day	T: 30-50 m ² /day

3. GROUND WATER QUALITY

3.1 Phreatic Aquifer (Aquifer-I): In general the water quality of shallow aquifer in Malshiras taluka is potable and good for drinking, domestic, industrial as well as irrigation purposes. Very high salinity prevails (>2250 $\mu\text{S}/\text{cm}$), which is not suitable for drinking, domestic, industrial as well as irrigation purposes. Ground water can be used for drinking only after treatment and for irrigation for very high salt tolerant crops and with proper soil and crop management practices.

3.2: Semiconfined/Confined Aquifer (Aquifer II) : In general the water quality of deep aquifer in Malshiras taluka is potable and very good for drinking, domestic, industrial as well as irrigation purposes. Nitrate more than 45 mg per litre was detected in water sample from Velapur EW & Fluoride more than 1.5 mg per litre was detected in water sample from Velapur EW.



4. GROUND WATER ISSUES

Over - Exploitation Declining WL
 Limited Aquifer Potential
 Water Scarcity - lean period

5. GROUND WATER RESOURCE & EXTRACTION

5.1. Aquifer-I/ Phreatic Aquifer (Basalt & Alluvium)

Ground Water Recharge Worthy Area (Sq. Km.)	1492.99
Total Annual Ground Water Recharge (MCM)	205.14
Natural Discharge (MCM)	10.26
Net Annual Ground Water Availability (Annual Extractable Ground Water Recharge)	194.88
Existing Gross Ground Water Draft for irrigation (MCM)	191.30
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	6.14
Existing Gross Ground Water Draft for All uses (MCM)	197.44
Provision for domestic and industrial requirement supply to 2025(MCM)	6.71
Net Ground Water Availability for future irrigation development (MCM)	19.97
Stage of Ground Water Development (%)	101.31
Category	O.E.

5.2 Aquifer-II Semiconfined/Confined Aquifer (Basalt)

Area (sq.km)	Mean thickness (m)	Piezometric head (m. above bottom of confining layer)	Sy	S	Resource above confining layer (mcm)	Resource in confining aquifer (mcm)	Total Resource (mcm)
1610.172	2.46	60	0.005	0.00019	18.35596	19.80512	38.16108

6.0. GROUND WATER RESOURCE ENHANCEMENT

6.1 SUPPLY (MCM)

Stage of GW Development	101.31%
Annual Available Resource (MCM)	194.88
Gross Annual Draft (MCM)	197.44
Agricultural Supply -GW	204.47
Agricultural Supply -SW	-
Domestic Supply - GW	6.13

Domestic Supply - SW		1.53
Total supply (MCM)		212.14
6.2. Supply Side Management		
Geographical Area (sq.km)		1528.01
Area feasible for recharge (sq. km.)		498.16
Unsaturated Volume (MCM)		996.32
Surplus water available for AR (MCM)		12.2
Proposed Structures	Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures	43	122
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	6.43	2.72
Total recharged @ 75 % efficiency (MCM)	9.15	
Current Annual Resource Availability (MCM)	194.88	
Current Annual Groundwater Extraction (MCM)	197.44	
Total GW resource available after supply side intervention (MCM)	204.03	
Stage of GWD after supply side interventions (%)	96.77	
Ground water available TO BRING STAGE OF GWD UPTO 70%	-54.62	
RTRWH Structures – Urban Areas		
Households to be covered (25% with 50 m ² area)	24890	
Total RWH potential (MCM)	0.65	
Rainwater harvested / recharged @ 80% runoff co-efficient	0.52	May be implemented if economically viable
6.3. Demand Side Management		
Micro irrigation techniques - Area proposed to be covered under drip (sq.km)		
Sugarcane	103	
Onion	0	
Volume of Water expected to be saved with drip irrigation (MCM)		
Sugarcane	58.71	
Onion	0	
Total Volume of Water expected to be saved (MCM)	58.71	
Total GW Draft after Demand side intervention	138.73	
Stage of GWD after demand side interventions (%)	67.99	
GWR available/required to bring the STAGE OF GWD isto 70% (MCM)	4.09	
Additional Area (sq.km.) proposed to be brought under assured GW irrigation	6.3	
Proposed Cropping Pattern change - Irrigated area under Water Intensive Crop(ha)	Not proposed	
Water Saving by Change in Cropping Pattern	Nil	

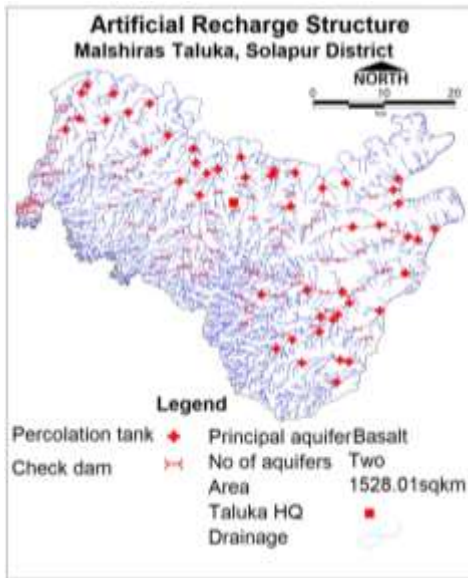
7.0. EXPECTED BENEFITS

Annual Extractable Ground Water Recharge (MCM)	194.88
Current Annual Ground Water Extraction (MCM)	197.44
Water Recharged by Supply side intervention (MCM)	9.15
Water saving by demand side intervention (MCM)	58.71
Present Stage of Ground Water Extraction (%)	101.31
Ground water resources after supply side management (MCM)	204.03
Ground water Draft after demand side management (MCM)	138.73
Expected Stage of Ground Water Extraction after Supply and Demand side interventions (%)	67.99
Alternate Water Sources Available	Nil

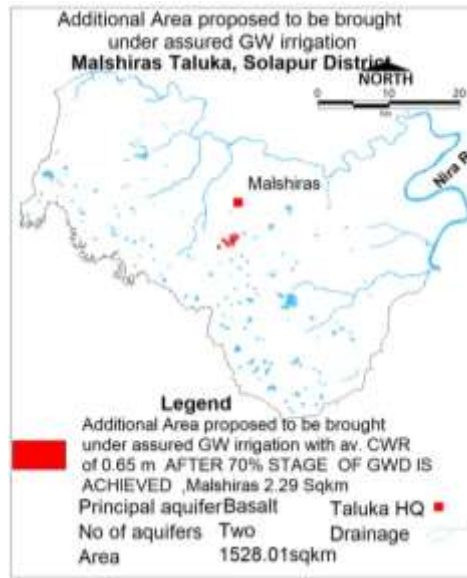
8. DEVELOPMENT PLAN

GW Resources Available for Development and Bring Stage of GWD upto 70% from present SOD	4.09
Proposed no. of DW (@ 1.5 ham for 90% of GWR Available)	246
Proposed no. of BW* (@ 1.5 ham for 10% of GWR Available)	27
Additional Area (sq.km.) proposed to be brought under assured Ground Water irrigation with av. CWR of 0.65 m with 70% Stage of GW Extraction	6.3

Proposed AR Structures



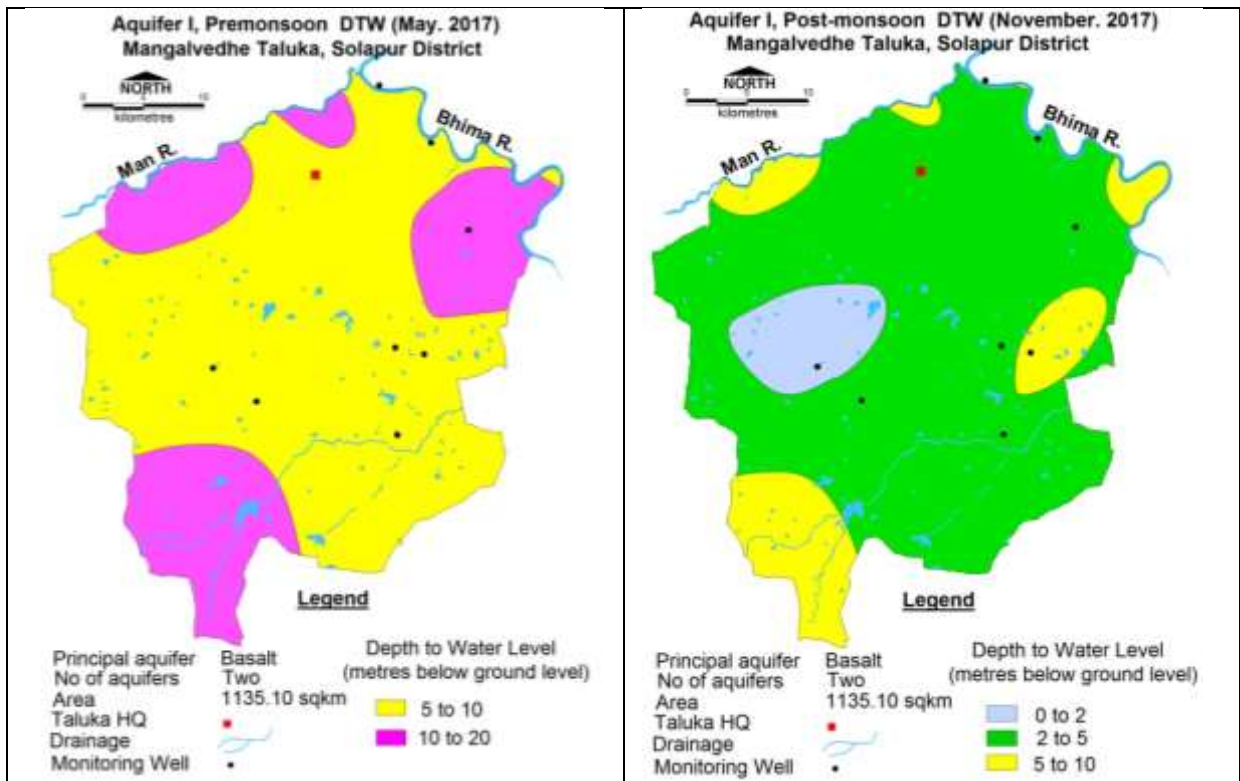
Additional area proposed to be bought under assured GW irrigation



9.6 MANGALVEDHE TALUKA, SOLAPUR DISTRICT, MAHARASHTRA

1. SALIENT INFORMATION																																															
1.1. Introduction																																															
Taluka Name	Mangalvedhe																																														
Geographical Area (Sq. Km.)	1144.92																																														
Hilly Area (Sq. Km)	0.00																																														
Saline Area (Sq. Km.)	0.00																																														
Population (2011)	205932																																														
Climate	Tropical																																														
1.2 Rainfall Analysis																																															
Annual Rainfall (2019)(mm)	560.5																																														
Decadal Average Annual Rainfall (2010-19) (mm)	407.0 mm																																														
Normal Rainfall (mm)	596.2 mm																																														
Long Term Rainfall Analysis (1998-2019)	Falling Trend -17.26 mm/year Probability of Normal/Excess Rainfall- 55% & 14%. Probability of Drought (Moderate/Severe)-: 23 % Moderate & 9 % Severe.																																														
Rainfall Trend Analysis (1998 To 2019) EQUATION OF TREND LINE: $y = -17.26x + 754.7$																																															
<table border="1"> <caption>Annual Rainfall Data (1998-2019)</caption> <thead> <tr> <th>Year</th> <th>Rainfall (mm)</th> </tr> </thead> <tbody> <tr><td>1998</td><td>780</td></tr> <tr><td>1999</td><td>620</td></tr> <tr><td>2000</td><td>350</td></tr> <tr><td>2001</td><td>500</td></tr> <tr><td>2002</td><td>720</td></tr> <tr><td>2003</td><td>700</td></tr> <tr><td>2004</td><td>700</td></tr> <tr><td>2005</td><td>700</td></tr> <tr><td>2006</td><td>700</td></tr> <tr><td>2007</td><td>950</td></tr> <tr><td>2008</td><td>580</td></tr> <tr><td>2009</td><td>780</td></tr> <tr><td>2010</td><td>650</td></tr> <tr><td>2011</td><td>320</td></tr> <tr><td>2012</td><td>400</td></tr> <tr><td>2013</td><td>450</td></tr> <tr><td>2014</td><td>420</td></tr> <tr><td>2015</td><td>280</td></tr> <tr><td>2016</td><td>320</td></tr> <tr><td>2017</td><td>450</td></tr> <tr><td>2018</td><td>180</td></tr> <tr><td>2019</td><td>560.5</td></tr> </tbody> </table>		Year	Rainfall (mm)	1998	780	1999	620	2000	350	2001	500	2002	720	2003	700	2004	700	2005	700	2006	700	2007	950	2008	580	2009	780	2010	650	2011	320	2012	400	2013	450	2014	420	2015	280	2016	320	2017	450	2018	180	2019	560.5
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2019	560.5																																														
1.3. Geomorphology &Geology																																															
Geomorphic Unit	Major parts of the taluka is Plateau slightly to moderately Dissected (PLS and PLM), with weathered thickness ranging from 0 to 1 m with isolated hills (Mesa and Butte) and valley areas forming Plateau weathered (PLWS - 0 to 2m weathering). Area in the Northern part is Alluvial Plain (APM).																																														
Soil	In general they are clayey loam in texture and fairly high in calcium carbonate, high porosity but moderate to low permeability, thus having low to moderate infiltration capacity. Based on physical characteristics the soils of the area have been classified into three major groups: Medium black soil, Red Sandy soils and Shallow black soils																																														
Geology	Alluvium : sand/ silt and clay alternating beds Age: Recent to Sub-recent Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene.																																														
1.4. Hydrology & Drainage																																															
Hydrology																																															

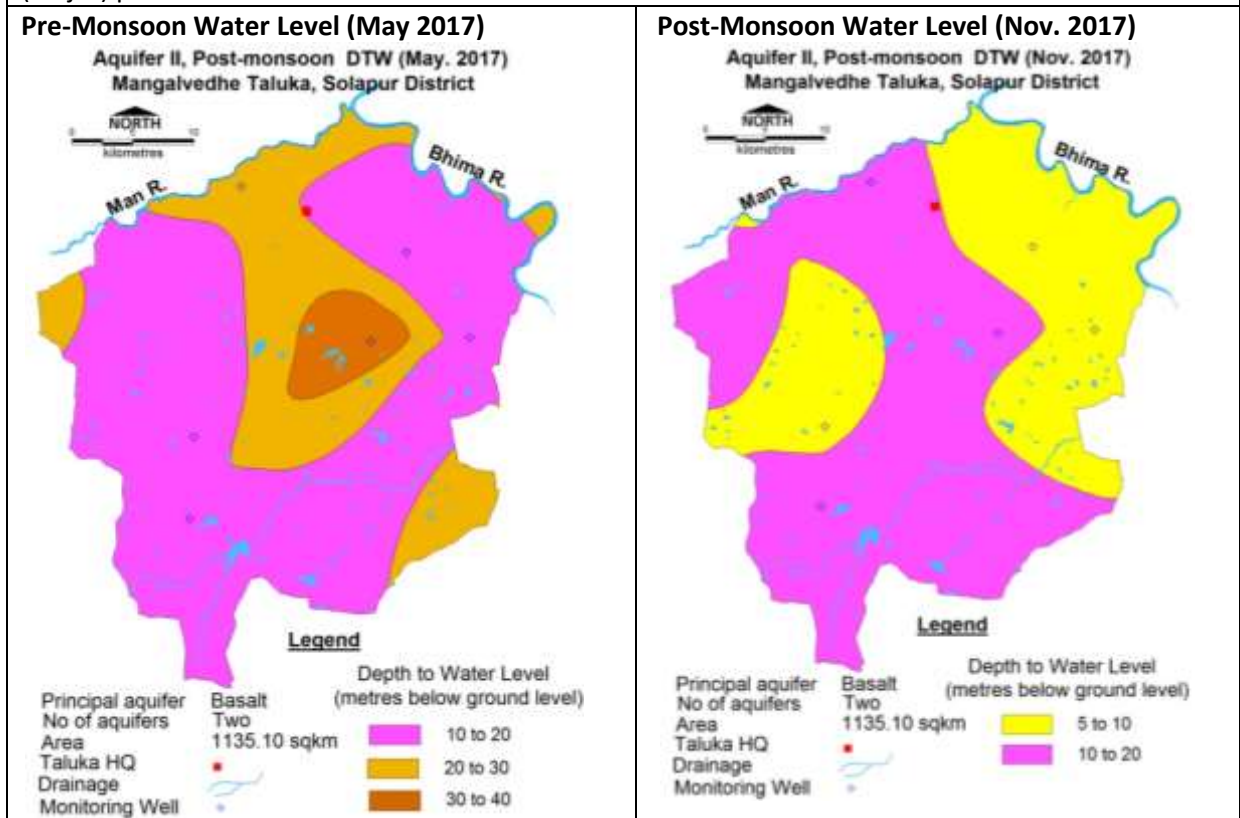
Bigger Minor Irrigation Project (>100 Ha.)	Completed: -3 MI Tanks
Minor Irrigation Project (<100 Ha.)	Completed: 13 PT, 54 KT weirs & 33 DB
Drainage	The taluka falls in Bhima subbasin. The taluka is drained by Man River and its tributaries i.e. Khurdu (Korda) River, flowing from West to East direction.
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern	
Geographical Area (Sq. Km.)	1144.92
Forest Area (Sq. Km.)	70.80
Net Sown Area (Sq. Km.)	671.46
Double Cropped Area (Sq. Km.)	36.52
Gross Cropped Area (Sq.km.)	707.98
Cultivable Area (Sq. Km.)	1052.64
Area under Irrigation (Sq. Km.)	
Ground Water	5.39
Surface Water	N.A.
Principal Crops	Area (Sq. Km.)(Reference year 2013-14)
Wheat	83.0
Jawar	447.0 (dry)
Bajra	62.33 (dry)
Maize	12.94 (dry)
Tur	1.6 (dry)
Gram	28.0 (dry)
Sugarcane	102.91
Grapes	21.53
Onion	3.00
Groundnut, Sunflower & Kardi	43.00 (dry)
1.6. Water Level Behaviour	
1.6.1. Phreatic Aquifer-Water Level	
Pre-Monsoon (May-2017)- Water level ranges from 5.5 m.bgl at Jalihal to 13 mbgl at Borale. Water level in the range of 5 to 10 mbgl has been observed in major part of the taluka, while water level in the range of 10 to 20 mbgl is observed in patches in southern, north- western and north-eastern parts of the taluka.	
Post-Monsoon (November-2017)- Water level ranges from 1.4 m.bgl at Jalihal to 6.5 mbgl at Kagasht. Water level less than 2 m.bgl is observed in the west–central part of the taluka. Water level in the range of 2 to 5 mbgl has been observed in major part of the taluka, and water level in the range of 5 to 10 mbgl is recorded in a small patches in the southern, north- western and north-eastern parts of the taluka.	
Pre-Monsoon Water Level (May 2017)	Post-Monsoon Water Level (Nov. 2017)



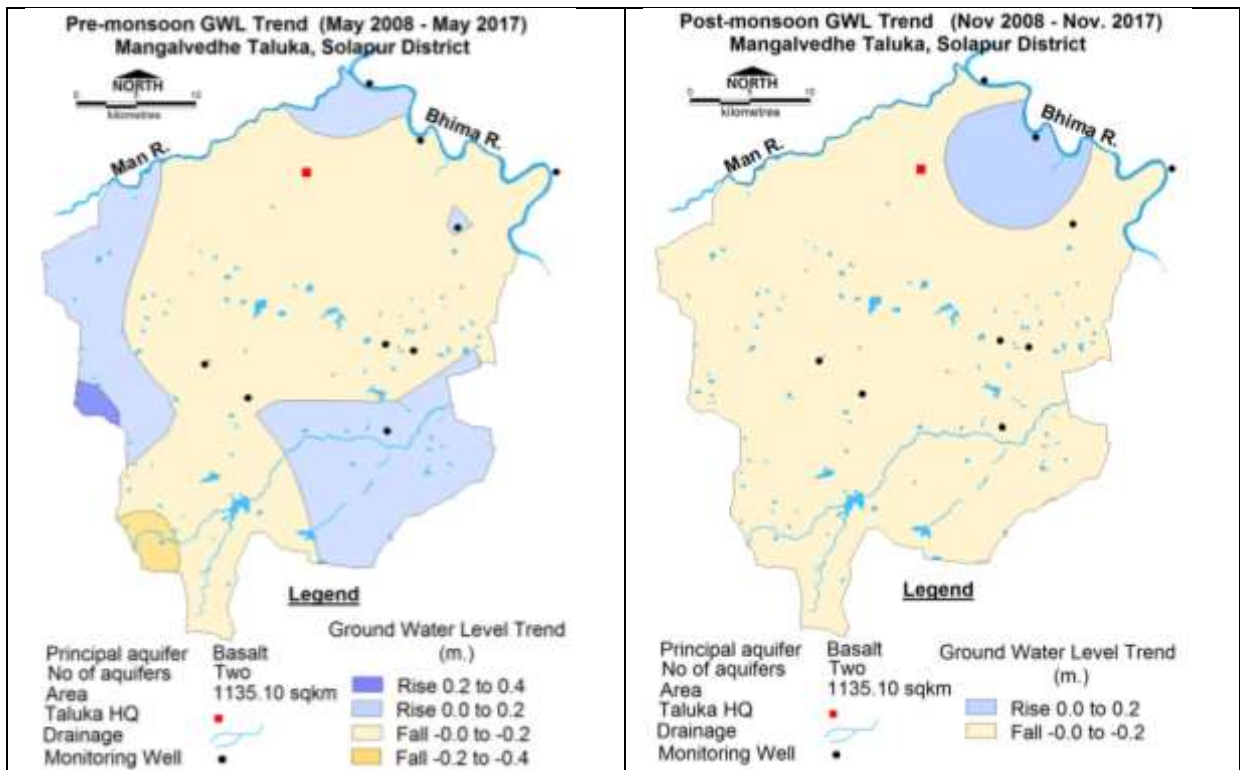
1.6.2. Semi-Confined/Confined Aquifer-Water Level

Pre-Monsoon (May-2017)- Water level in the range of 10 to 20 mbgl is observed in major part of the taluka; deeper water level between 20 to 40 mbgl is observed in the north-central and south-eastern part of the taluka.

Post-Monsoon (November-2017)- Water level <10 mbgl is observed in west-central and north-eastern parts of the taluka. Water level in the range of 10 to 20 mbgl is observed in remaining (major) part of the taluka.



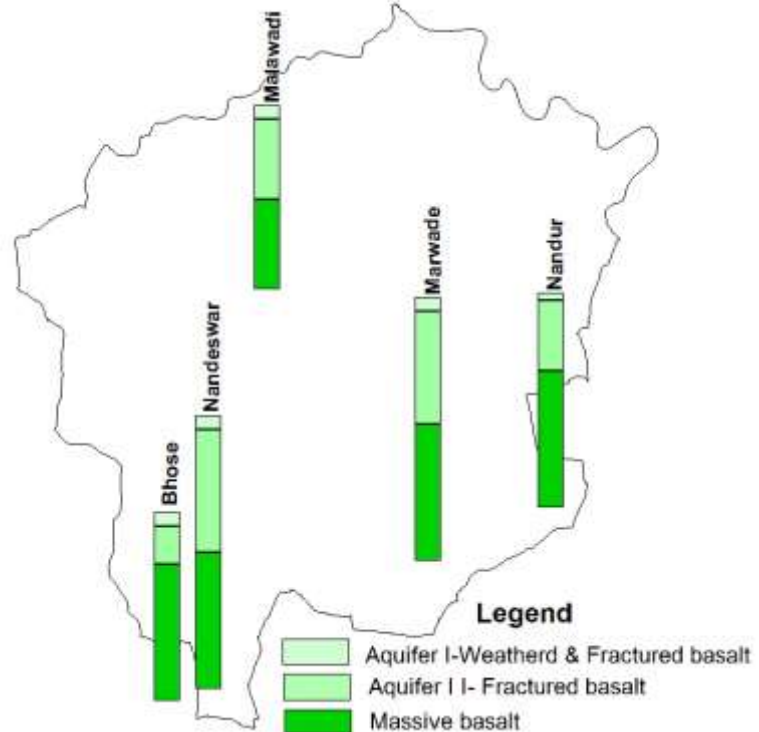
1.6.4. Hydrograph	Hydrograph shows Pre-monsoon rising trend @ 0.037 m/year	Hydrograph shows Post-monsoon rising trend @ 0.022 m/year
<p style="text-align: center;"><i>Hydrograph</i></p> <p style="text-align: center;"><i>Site Name : Mangalvedha State : Maharashtra District : Solapur Tahsil : MANGALVEDHE Block : MANGALVEDHE Village : Mangalvedha</i></p> <p style="text-align: center;">Time</p> <p style="text-align: center;"> <input checked="" type="checkbox"/> AIMWtrLvl <input checked="" type="checkbox"/> PreMonWtrLvlTrend <input checked="" type="checkbox"/> PostMonWtrLvlTrend <input checked="" type="checkbox"/> AIMWtrLvlTrend </p>		
1.6.3. Water Level Trend (2008-2017)		
Pre-Monsoon trend	<p>Rising: 0.01265 m/year at Kagasht to 0.25361 m/year at Diksal</p> <p>Falling: 0.00074 m/year at Siddhankeri to 0.05456 m/year at Pout</p> <p>Rising water level trend up to 0.2 m/year is observed in patches in north-central, western fringe area and south-eastern part of the taluka; Declining water level trend up to 0.2 m/year has been observed in major part of the taluka, while a small patch in the south-western part has experienced falling trend in the range of 0.2 to 0.4 m, in water level.</p>	
Post-Monsoon trend	<p>Rising: 0.02616 m/year at Borale to 0.09104 m/year at Diksal.</p> <p>Falling: 0.16461 m/year at Barmhapuri.</p> <p>Falling water level trend up to 0.2 m/year is observed in entire taluka, except around Barmhapuri in north-eastern part of the taluka, where rising water level trend up to 0.2 m/year has been observed.</p>	
Premonsoon Water level Trend (2008-17)	Postmonsoon Water level Trend (2008-17)	



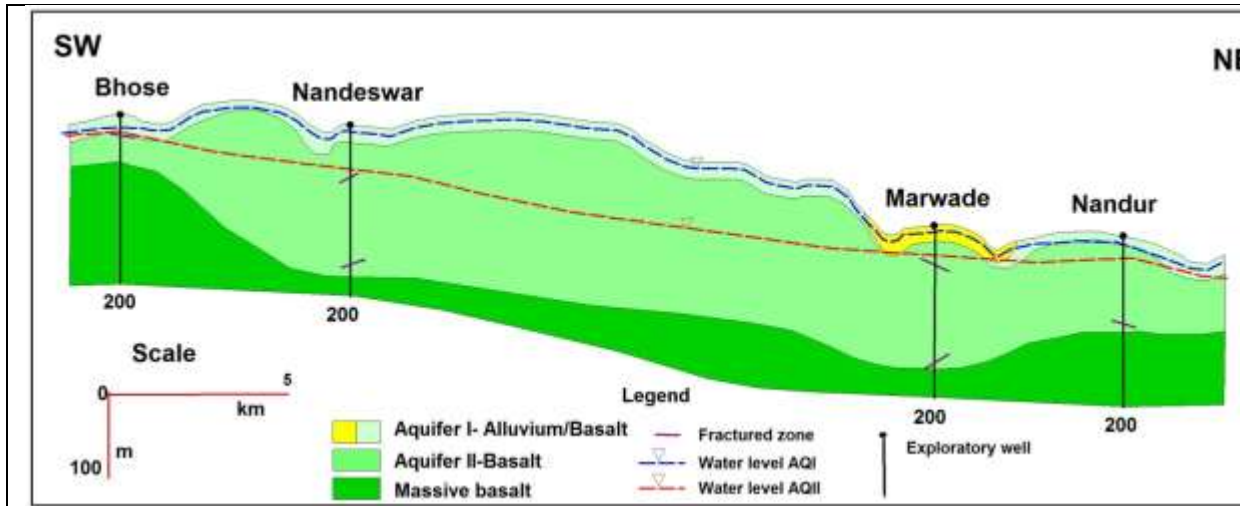
2. AQUIFER DISPOSITION

2.1. Number of Aquifers	Aquifer-I: Alluvium & Basalt	Aquifer-II: Basalt
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2.2. Bar Diagram



2.3. Cross Sections



2.4. Aquifer Characteristics

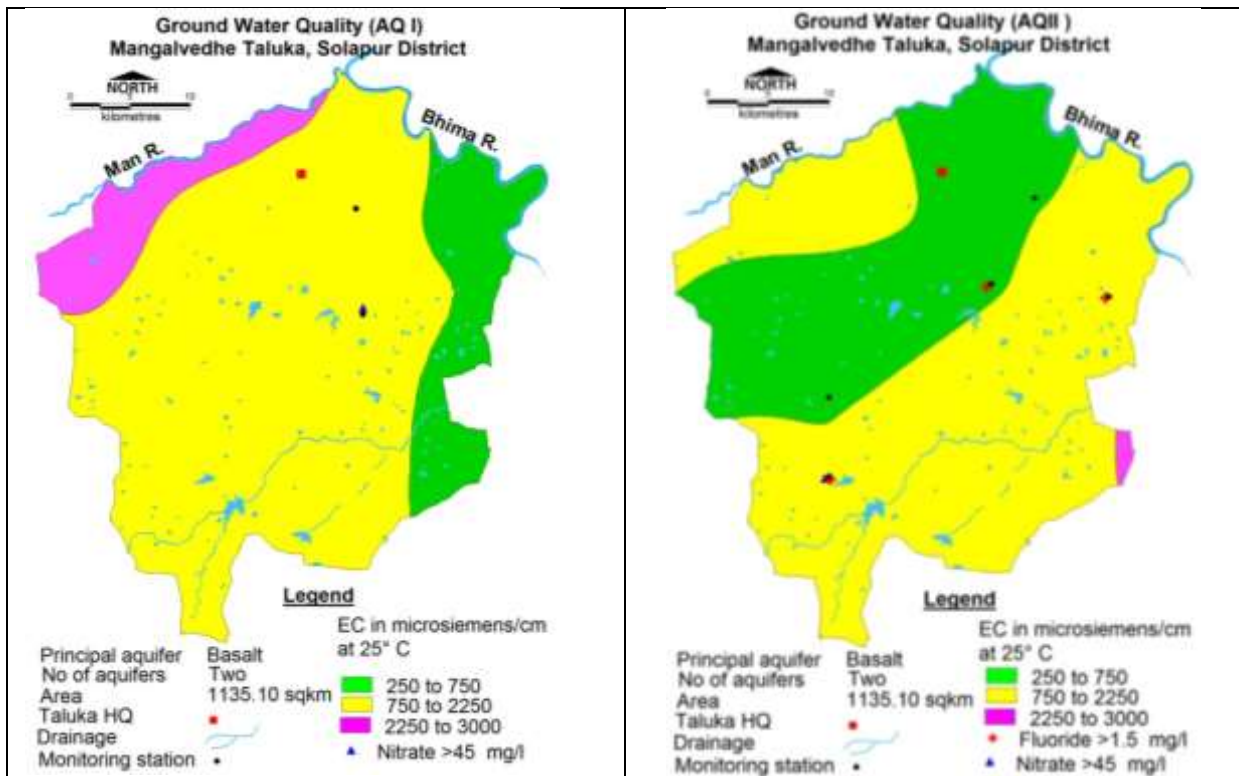
Major Aquifers	Basalt (Alluvium in a patch around Marwade)	Basalt
Type of Aquifer	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)
Depth of Occurrence (mbgl)	8 - 30	40 - 181
Thickness of wearherd /fractured rocks (m)	5 - 15	1.25 - 11
Yield	10 - 100 m ³ /day	0.1 - 5 lps
Specific yield (Sy)	0.005- 0.02	0.003
Storativity (S)		0.00012
Transmissivity (T) (m ² /day)	T: 5-20 m ² /day	T: 30-70 m ² /day

3. GROUND WATER QUALITY

3.1 Phreatic Aquifer (Aquifer-I): In general the water quality of shallow aquifer in Mangalvedhe taluka is potable and good for drinking, domestic, industrial as well as irrigation purposes. Nitrate more than 45 mg per litre was detected in water sample from Marwade.

3.2: Semiconfined/Confined Aquifer (Aquifer II): In general the water quality of deep aquifer in Mangalvedhe taluka is potable and very good for drinking, domestic, industrial as well as irrigation purposes. . Nitrate more than 45 mg per litre was detected in water sample from Bhose. Fluoride more than 1.5 mg per litre was detected in water sample from Bhose, Marwade and Nanaur EW.

Phreatic Aquifer (Aquifer-I)	Semiconfined/Confined Aquifer (Aquifer II)
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4. GROUND WATER ISSUE	<p>Scanty rainfall</p> <p>Limited Aquifer Potential</p> <p>Water Scarcity - lean period</p> <p>Cropping of water intensive crops</p>
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5. GROUND WATER RESOURCE & EXTRACTION

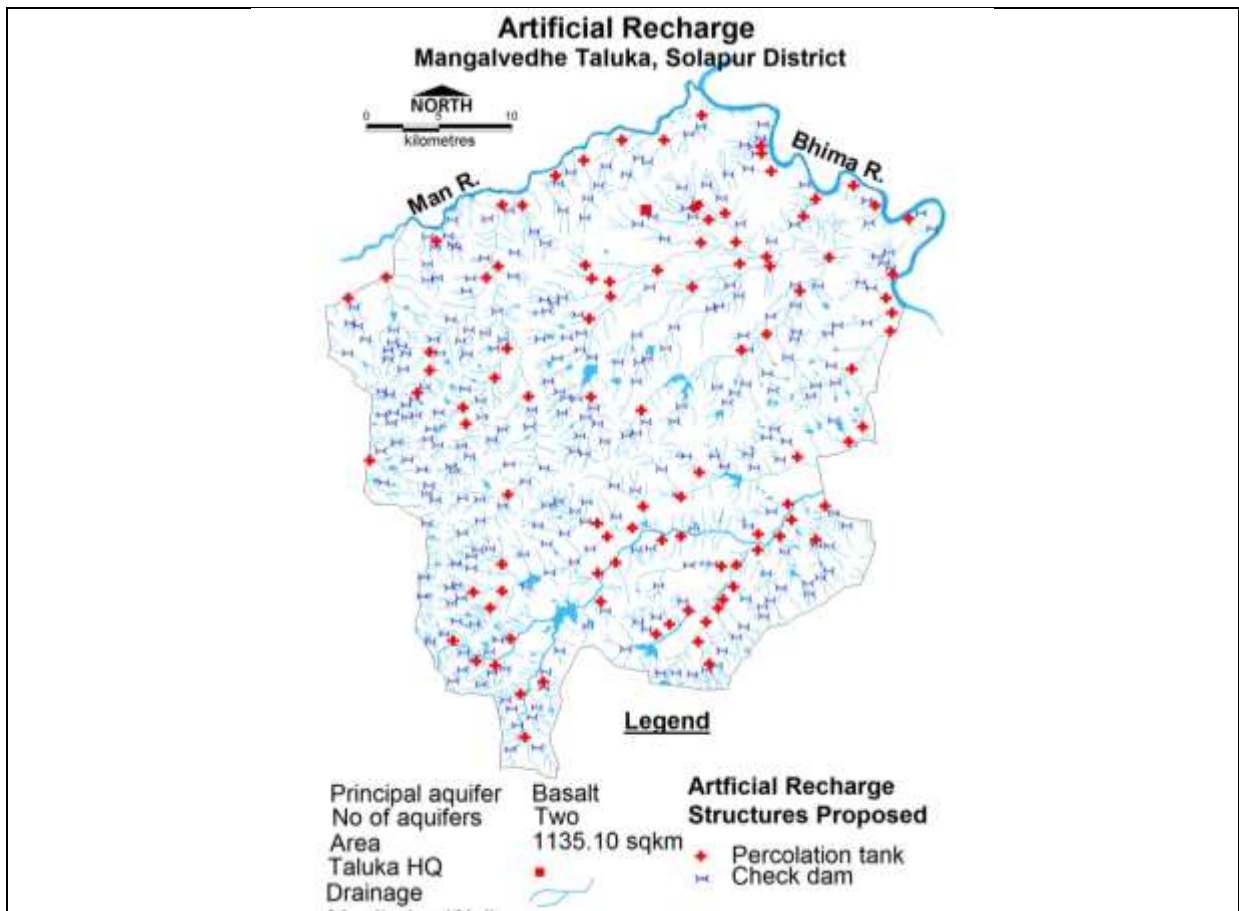
5.1. Aquifer-I/ Phreatic Aquifer (Basalt)

Ground Water Recharge Worthy Area (Sq. Km.)	1135.10
Total Annual Ground Water Recharge (MCM)	88.96
Natural Discharge (MCM)	4.45
Net Annual Ground Water Availability (Annual Extractable Ground Water Recharge) (MCM)	84.52
Existing Gross Ground Water Extraction for irrigation (MCM)	64.55
Existing Gross Ground Water Extraction for domestic and industrial water supply(MCM)	3.01
Existing Gross Ground Water Extraction for All uses(MCM)	67.56
Provision for domestic and industrial requirement supply to 2025(MCM)	3.71
Net Ground Water Availability for future irrigation development (MCM)	16.29
Stage of Ground Water Development (%)	79.94
Category	SEMI CRITICAL

5.2 Aquifer-II - Semiconfined/Confined Aquifer (Basalt)

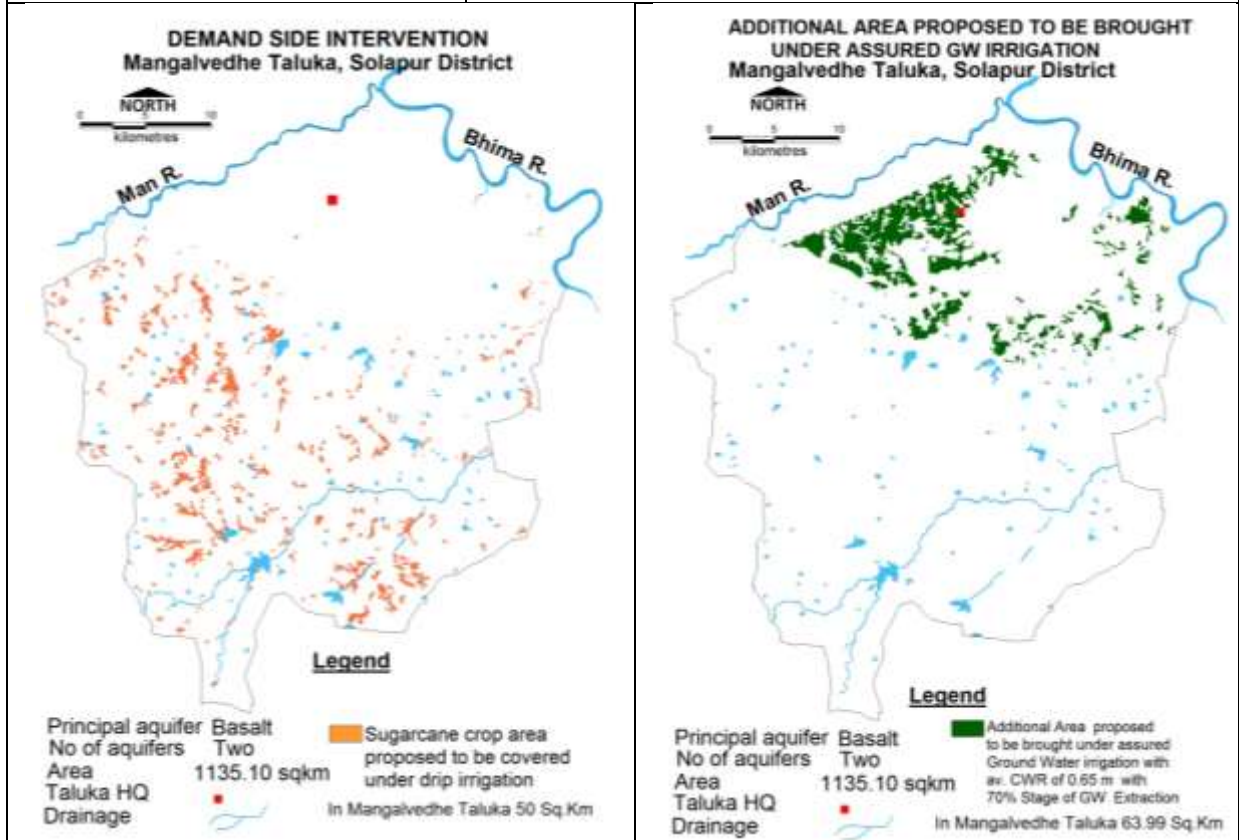
Area (sq.km)	Mean thickness (m)	Piezometric head (meter above bottom of confining)	Sy	S	Resource above confining layer (mcm)	Resource in confining aquifer (mcm)	Total Resource (mcm)

		layer)					
1135.967	1.25 to 9	55 to 90	0.003 to 0.005	0.00057	16.09583	26.72333	42.8191
6.0. GROUND WATER RESOURCE ENHANCEMENT							
Stage of GW Development			79.94%				
Annual Available Resource (MCM)			84.52				
Gross Annual Draft (MCM)			67.56				
6.1 SUPPLY (MCM)							
Agricultural Supply -GW			64.55				
Agricultural Supply -SW			9				
Domestic Supply - GW			3.01				
Domestic Supply - SW			0.7525				
Total supply (MCM)			77.31				
Stage of GW Development			79.94%				
Annual Available Resource (MCM)			84.52				
6.2. Supply Side Management							
Rainwater Harvesting and Artificial Recharge							
Geographical Area (sq.km)			1135.1				
Area feasible for recharge (sq. km.)			1162.88				
Unsaturated Volume (MCM)			2325.76				
Surplus water available for AR (MCM)			28.49				
Proposed Structures			Percolation Tank (@ Rs.150 lakh, Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)			Check Dam (@ Rs.30 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)	
Number of Structures			100			285	
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)			14.96			6.41	
Total recharged @ 75 % efficiency (MCM)			21.37				
Current Annual Resource Availability (MCM)			84.52				
Current Annual Groundwater Extraction (MCM)			67.56				
Total GW resource available after supply side intervention (MCM)			105.88				
Stage of GWD after supply side interventions (%)			63.81				
Ground water available TO BRING STAGE OF GWD UPTO 70%			6.56				



RTRWH - Urban Areas	May be implemented if economically viable
Households to be covered (10% with 50 m ² considering roof top area)	4178
Total RWH potential (MCM)	0.12
Rainwater harvested / recharged @ 80% runoff co-efficient	0.09
Micro irrigation techniques - Area proposed to be covered under drip (sq.km)	
Sugarcane	50
Onion	0.3
Volume of Water expected to be saved with drip irrigation (MCM)	
Sugarcane	28.5
Onion	0.08
Total Volume of Water expected to be saved (MCM)	28.58
Total GW Draft after Demand side intervention	38.98
Stage of GWD after demand side interventions (%)	36.82
GWR available/required to bring the stage of GWD to 70% (MCM)	35.13
Additional Area (sq.km.) proposed to be brought under assured GW irrigation	54.05
Proposed Cropping Pattern change -Irrigated area under Water	Not proposed

Intensive Crop(ha)	
Water Saving by Change in Cropping Pattern	Nil



7.0. EXPECTED BENEFITS

Annual Extractable Ground Water Recharge (MCM)	84.52
Current Annual Ground Water Extraction (MCM)	67.56
Water Recharged by Supply side intervention (MCM)	21.37
Water saving by demand side intervention (MCM)	28.58
Present Stage of Ground Water Extraction (%)	79.94
Ground water resources after supply side management (MCM)	105.88
Ground water Draft after demand side management (MCM)	38.98
Expected Stage of Ground Water Extraction after Supply and Demand side interventions (%)	36.82

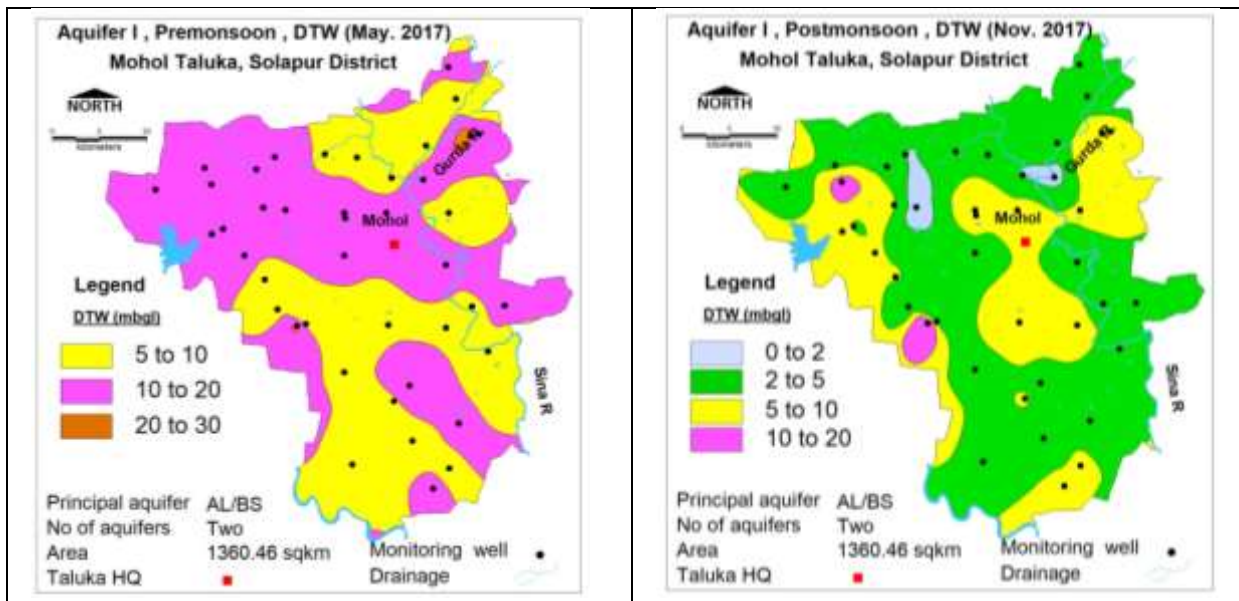
8. DEVELOPMENT PLAN

Volume of water available for GWD to enhance stage of GWD to 70% (MCM)	35.13
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	2108
Proposed Number of BW (@ 1.5 ham for 10% of GWR Available)	234
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	54.05

9.7 MOHOL TALUKA, SOLAPUR DISTRICT, MAHARASHTRA

1. SALIENT INFORMATION																																											
1.1. introduction																																											
Taluka Name	Molol																																										
Geographical Area (Sq. Km.)	1324.7																																										
Hilly Area (Sq. Km)	0																																										
Saline Area (Sq. Km.)	0																																										
Population (2011)	276920																																										
Climate	Tropical																																										
1.2 Rainfall Analysis																																											
Annual Rainfall (2017) (mm)	526.3 mm																																										
Decadal Average Annual Rainfall (2007-17) (mm)	522 mm																																										
Normal Rainfall (mm)	575 mm																																										
Long Term Rainfall Analysis (1998-2017)	Rising Trend 0.479 mm/year Normal/Excess Rainfall: 70% & 10%. Probability of Drought (Moderate/Severe)-: 10% Moderate & 10% Severe.																																										
Rainfall Trend Analysis (1901 To 2017) EQUATION OF TREND LINE: $y = -17.944x + 763.73$																																											
<table border="1"> <caption>Annual Rainfall Data (1998-2017)</caption> <thead> <tr> <th>Year</th> <th>Rainfall (mm)</th> </tr> </thead> <tbody> <tr><td>1998</td><td>1300</td></tr> <tr><td>1999</td><td>580</td></tr> <tr><td>2000</td><td>650</td></tr> <tr><td>2001</td><td>600</td></tr> <tr><td>2002</td><td>550</td></tr> <tr><td>2003</td><td>200</td></tr> <tr><td>2004</td><td>450</td></tr> <tr><td>2005</td><td>620</td></tr> <tr><td>2006</td><td>600</td></tr> <tr><td>2007</td><td>620</td></tr> <tr><td>2008</td><td>650</td></tr> <tr><td>2009</td><td>580</td></tr> <tr><td>2010</td><td>1020</td></tr> <tr><td>2011</td><td>500</td></tr> <tr><td>2012</td><td>300</td></tr> <tr><td>2013</td><td>520</td></tr> <tr><td>2014</td><td>420</td></tr> <tr><td>2015</td><td>280</td></tr> <tr><td>2016</td><td>320</td></tr> <tr><td>2017</td><td>526.3</td></tr> </tbody> </table>		Year	Rainfall (mm)	1998	1300	1999	580	2000	650	2001	600	2002	550	2003	200	2004	450	2005	620	2006	600	2007	620	2008	650	2009	580	2010	1020	2011	500	2012	300	2013	520	2014	420	2015	280	2016	320	2017	526.3
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1.3. Geomorphology &Geology																																											
Geomorphic Unit	Alluvial Plain of Sina River and Plateau (Undissected to highly Dissected) with weathered thickness ranging from 0 to 1 m.																																										
Soil	In general, they are clayey loam in texture and fairly high in calcium carbonate, high porosity but moderate to low permeability, thus having low to moderate infiltration capacity. Based on physical characteristics the soils of the area have been classified into three major groups: Medium black soil, Red Sandy soils and Shallow black soils																																										
Geology	Alluvium: sand/ silt and clay alternating beds Recent to Sub-recent Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene																																										
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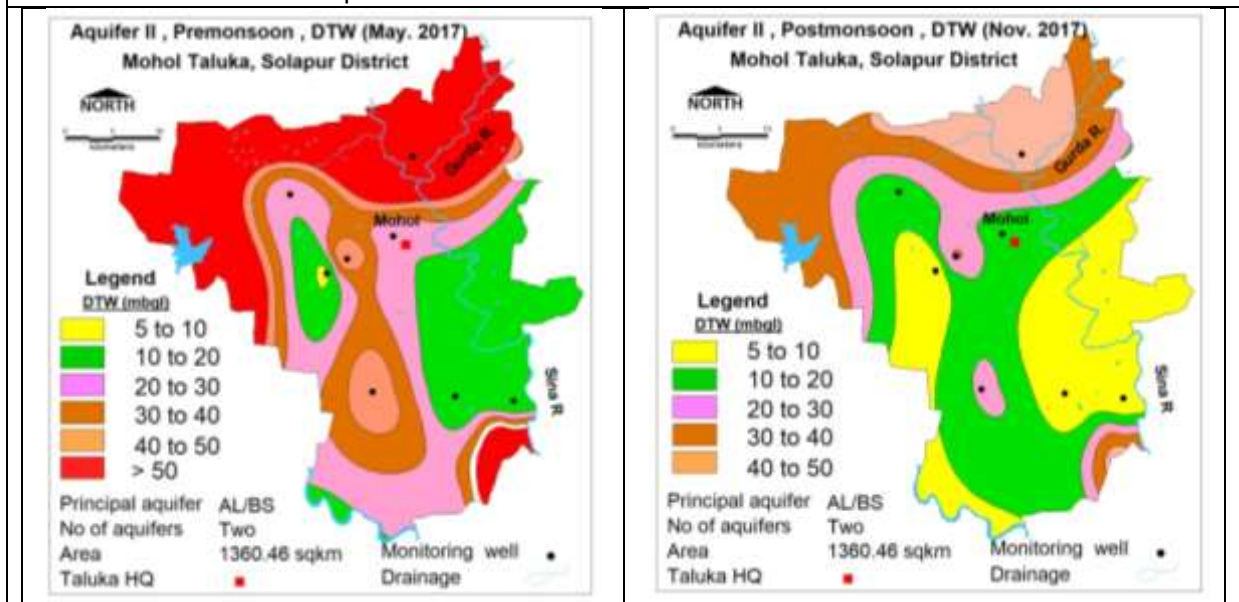
Bigger Minor Irrigation Project (>100 Ha.)	Completed: -7 MI Tanks
Minor Irrigation Project (<100 Ha.)	Completed: -351 1VT, 66 KT weirs & 43 DB
Drainage	The area is drain by Sina rivers and its tributaries, flow from NW to SE direction in central part of the taluka
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern	
Geographical Area (Sq. Km.)	1324.7
Forest Area (Sq. Km.)	15.91
Net Sown Area (Sq. Km.)	910.92
Double Cropped Area (Sq. Km.)	32.76
Gross Cropped Area (sq.km)	943.68
Cultivable Area (Sq. Km.)	1206.53
Area under Irrigation (Sq. Km.)	
Ground Water	191.8
Surface Water	65.73
Principal Crops	Area (Sq. Km.) (Reference year 2013-14)
Wheat	50.56
Jawar	1002.61
Bajra	7.34
Maize	27.45
Tur	12.09
Sugarcane	48.71
Chilli	1.39
Mango	2.99
Onion	4.99
Sunflower	20.43
1.6. Water Level Behaviour	
1.6.1. Phreatic Aquifer-Water Level	
Pre-Monsoon (May-2017)- Water level in the range of 10 -20 mbgl has been observed in major part of the taluka, while water level less than 10 mbgl observed in northern and southern part of the taluka.	
Post-Monsoon (November-2017)- Water Level less than 5 mbgl has been observed in northern, north-western and southern parts of the Taluka while water level in the range of 5 to 10 mbgl is observed as isolated patch	



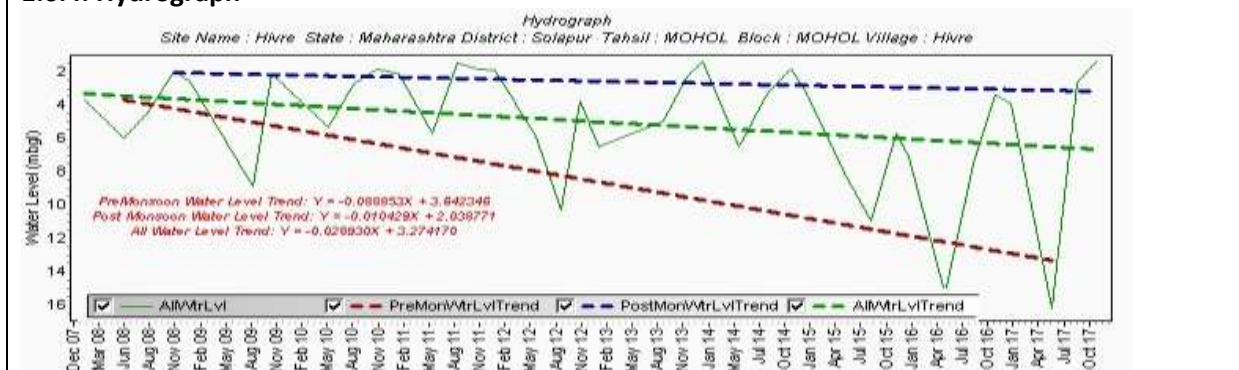
1.6.2. Semi-Confined/Confined Aquifer-Water Level

Pre-Monsoon (May-2016)- Water level > 20 mbgl is observed in south western part of the Taluka; water level between 10 to 20 mbgl is observed in northeastern part of the Taluka.

Post-Monsoon (November-2017)-Water level <10 mbgl is observed in north eastern and south-western parts of the Taluka; 10 to 20 mbgl is observed in major part of the Taluka while >20 mbgl is observed in north western part of the Taluka.

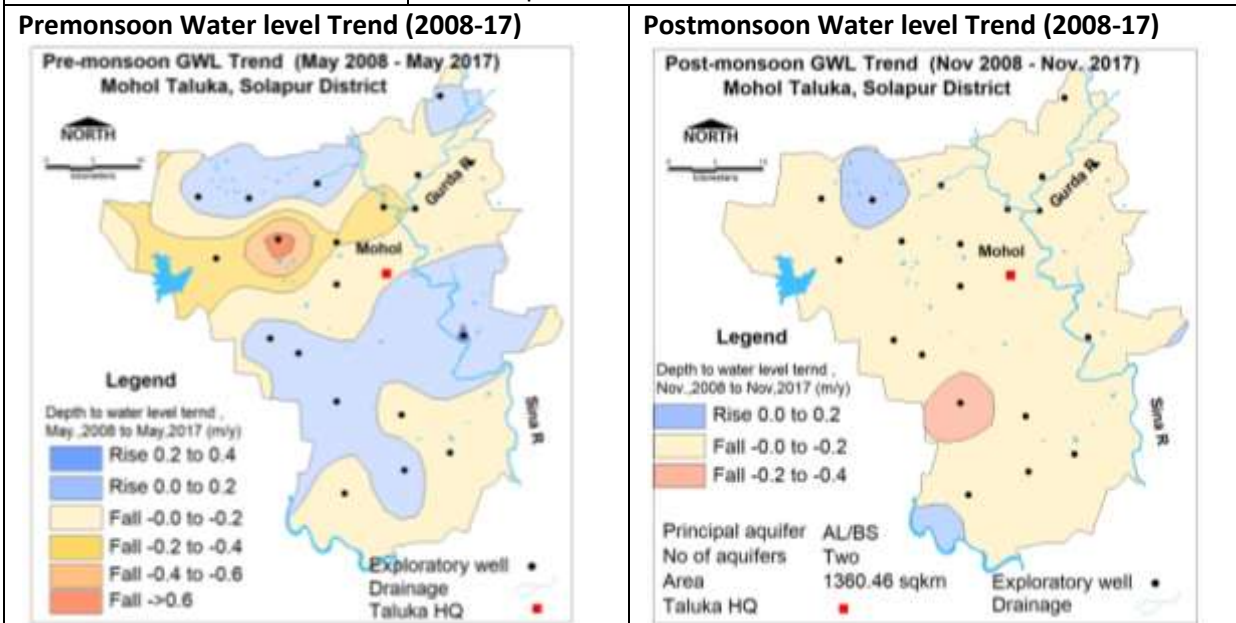


1.6.4. Hydrograph



Hydrograph shows Pre-monsoon rising trend @ 0.38 m/year	Hydrograph shows Post-monsoon rising trend @ 0.135 m/year
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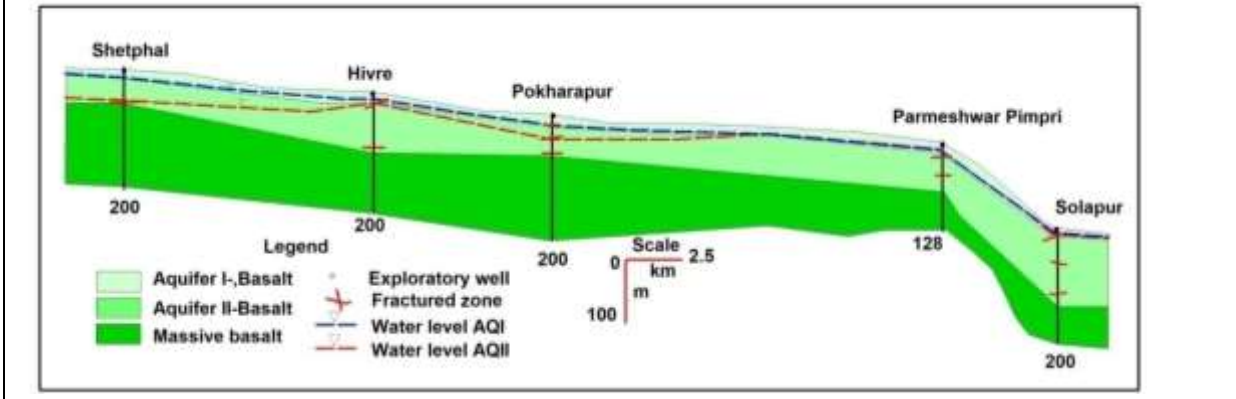
1.6.3. Water Level Trend (2008-2017)	
Pre-Monsoon trend	Rising 0.0016 to 0.2 m/year
	Falling 0.015 to 0.67 m/year
	Declining trend up to 0.2 m/year is observed in 50% area of Taluka; decline in water level >0.2 m/year has been observed in eastern part of the Taluka. Rising water level trend has been observed in small part in northern and southern parts and isolated parts in western part of the Taluka.
Post-Monsoon trend	Rising 0.1 m/year
	Falling 0.009 to 0.268 m/year
	Declining trend up to 0.2 m/year is observed in 50% area of Taluka; decline in water level >0.2 m/year has been observed in eastern part of the Taluka. Rising water level trend has been observed in small part in northern and southern parts and isolated parts in western part of the Taluka.



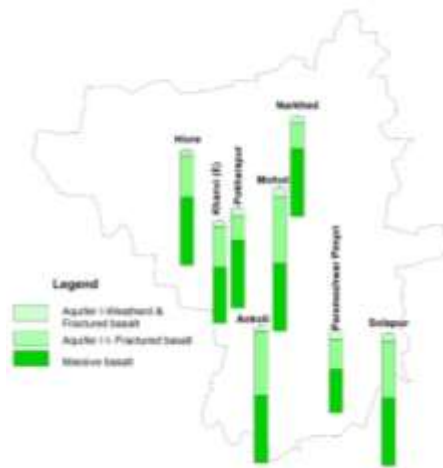
2. AQUIFER DISPOSITION

2.1. Number of Aquifers	Aquifer-I: Alluvium & Basalt	Aquifer-II: Basalt
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2.3. Cross Sections



2.2. Bar Diagram



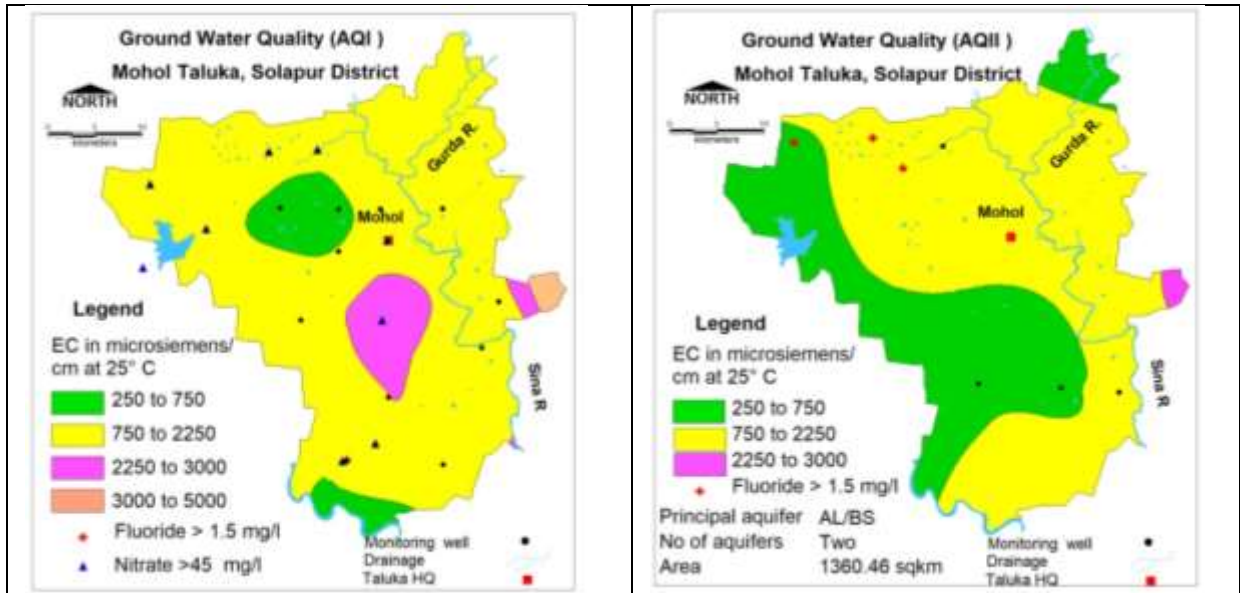
2.4. Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)	
Type of Aquifer	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)
Depth of Occurrence (mbgl)	8 - 30	50 - 196
Thickness of weathered/fractured rocks (m)	5 - 15	1.25 - 5
Yield	10 - 100 m ³ /day	0.1 - 1.5 lps
Specific yield (Sy)	0.02	0.0025
Storativity (S)		0.00057
Transmissivity (T) (m ² /day)	T: 15-30 m ² /day	T: 30-60 m ² /day

3. GROUND WATER QUALITY

3.1 Phreatic Aquifer (Aquifer-I) In general the water quality of shallow aquifer in Mohol taluka is potable and good for drinking, domestic, industrial as well as irrigation purposes. Nitrate more than 45 mg per litre was detected in water sample from Ashti, Teoti, Mohol, Angar, Sohale Ichgaon, Fluoride more than 1.5 mg per litre was detected in water sample from Ichgaon . very high salinity prevails (>2250 μ S/cm), which is not suitable for drinking, domestic, industrial as well as irrigation purposes. Ground water can be used for drinking only after treatment and for irrigation for very high salt tolerant crops and with proper soil and crop management practices.

3.2: Semiconfined/Confined Aquifer (Aquifer II) : In general the water quality of deep aquifer in Mohol taluka is potable and very good for drinking, domestic, industrial as well as irrigation purposes. Fluoride more than 1.5 mg per litre was detected in water sample from Mohol, Shetphal and Narkhed EW.



4. GROUND WATER ISSUE	Over - Exploitation Declining WL Limited Aquifer Potential Water Scarcity - lean period
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5. GROUND WATER RESOURCE & EXTRACTION

5.1. Aquifer-I/ Phreatic Aquifer (Basalt & Alluvium)

Ground Water Recharge Worthy Area (Sq. Km.)	1360.46
Total Annual Ground Water Recharge (MCM)	141.07
Natural Discharge (MCM)	7.37
Net Annual Ground Water Availability (Annual Extractable Ground Water Recharge)	133.71
Existing Gross Ground Water Draft for irrigation (MCM)	114.54
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	4.80
Existing Gross Ground Water Draft for All uses (MCM)	119.34
Provision for domestic and industrial requirement supply to 2025(MCM)	5.40
Net Ground Water Availability for future irrigation development (MCM)	24.88
Stage of Ground Water Development (%)	89.26
Category	Semi Critical

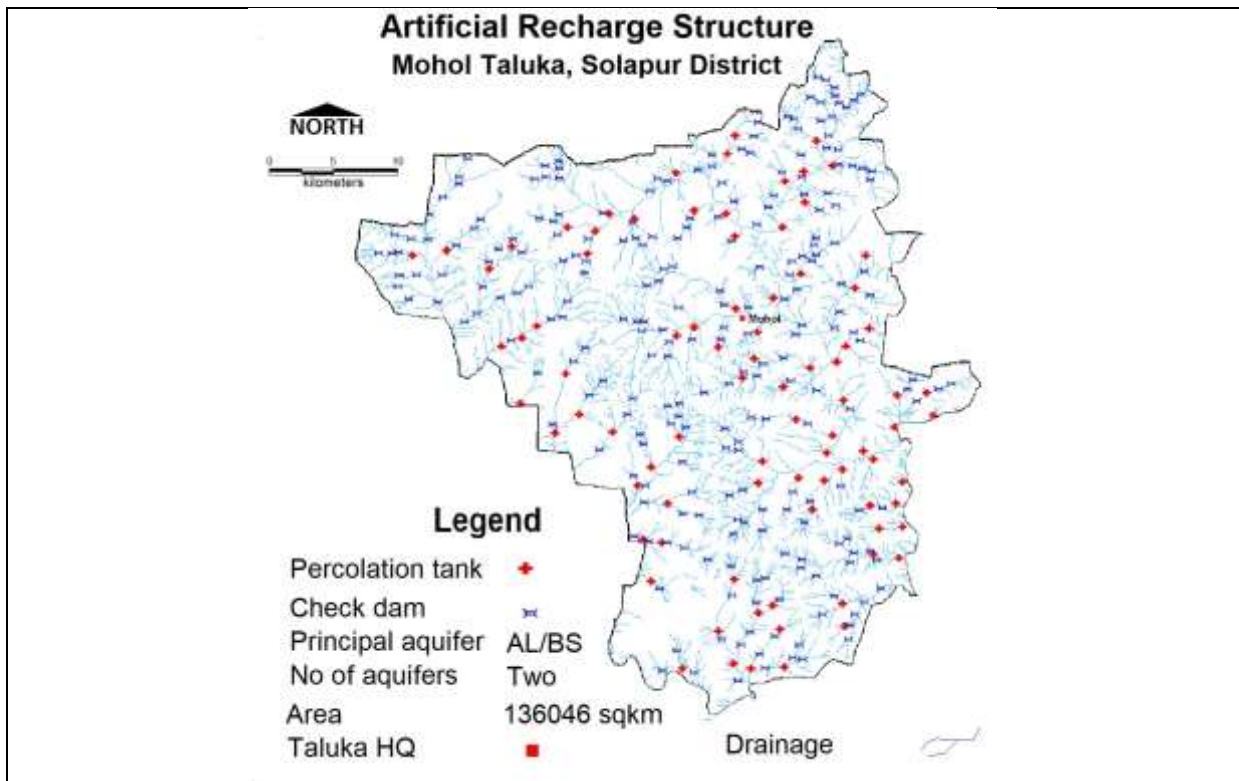
5.2 Aquifer-II Semiconfined/Confined Aquifer (Basalt)

Area (sq.km)	Mean thickness (m)	Piezometric head (meter above bottom of confining layer)	Sy	S	Resource above confining layer (mcm)	Resource in confining aquifer (mcm)	Total Resource (mcm)
1326.903	4	39.97	0.0055	0.0005	26.51816	29.19187	55.71002

6.0. GROUND WATER RESOURCE ENHANCEMENT

Stage of GW Development	89.26%
Annual Available Resource (MCM)	133.71

Gross Annual Draft (MCM)	119.34	
6.1 SUPPLY (MCM)		
Agricultural Supply -GW	124.67	
Agricultural Supply -SW	-	
Domestic Supply - GW	4.8	
Domestic Supply - SW	1.2	
Total supply (MCM)	130.67	
6.2. Supply Side Management		
Geographical Area (sq.km)	1360.46	
Area feasible for recharge (sq. km.)	1228.42	
Unsaturated Volume (MCM)	2456.84	
Surplus water available for AR (MCM)	24.5	
Proposed Structures	Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures	86	245
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	12.88	5.50
Total recharged @ 75 % efficiency (MCM)	18.38	
Current Annual Resource Availability (MCM)	133.71	
Current Annual Groundwater Extraction (MCM)	119.34	
Total GW resource available after supply side intervention (MCM)	152.08	
Stage of GWD after supply side interventions (%)	78.47	
Ground water available TO BRING STAGE OF GWD UPTO 70%	-12.88	
No. of farm ponds	0	
Volume of water available for harvesting	0	
No of waterbody in saline patch (Area more than 2.5 ha)	Nil	
Additional volume created by desilting	Nil	



RTRWH Structures – Urban Areas		
Households to be covered (25% with 50 m ² area)	14200	
Total RWH potential (MCM)	0.37062	
Rainwater harvested / recharged @ 80% runoff coefficient	0.296496	May be implemented if economically viable
6.3. Demand Side Management		
Micro irrigation techniques - Area proposed to be covered under drip (sq.km)		
Sugarcane	17	
Onion	0	
Volume of Water expected to be saved with drip irrigation (MCM)		
Sugarcane	9.69	
Onion	0	
Total Volume of Water expected to be saved (MCM)	9.69	
Total GW Draft after Demand side intervention	109.65	
Stage of GWD after demand side interventions (%)	72.1	
GWR available/required to bring the stage of GWD to 70% (MCM)	-3.19	
Additional Area (sq.km.) proposed to be brought under assured GW irrigation	0	
Proposed Cropping Pattern change in Irrigated area under Water Intensive Crop(ha)	Not proposed	
Water Saving by Change in Cropping Pattern	Nil	
7.0. EXPECTED BENEFITS		
Annual Extractable Ground Water Recharge (MCM)	133.71	
Current Annual Ground Water Extraction (MCM)	119.34	

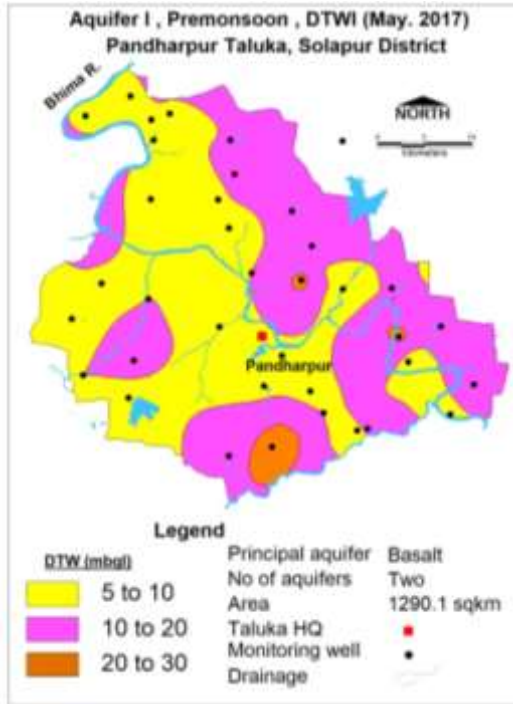
Water Recharged by Supply side intervention (MCM)	18.38
Water saving by demand side intervention (MCM)	9.69
Present Stage of Ground Water Extraction (%)	89.25
Ground water resources after supply side management (MCM)	152.08
Ground water Draft after demand side management (MCM)	109.65
Expected Stage of Ground Water Extraction after Supply and Demand side interventions (%)	72.1
8. DEVELOPMENT PLAN	
GW Resources Available for Development and Bring Stage of GWD upto 70% from present SOD	0
Proposed no. of DW (@ 1.5 ham for 90% of GWR Available)	0
Proposed no. of BW* (@ 1.5 ham for 10% of GWR Available)	0
Additional Area (sq.km.) proposed to be brought under assured Ground Water irrigation with av. CWR of 0.65 m with 70% Stage of GW Extraction	0

9.8 PANDHARPUR TALUKA, SOLAPUR DISTRICT, MAHARASHTRA

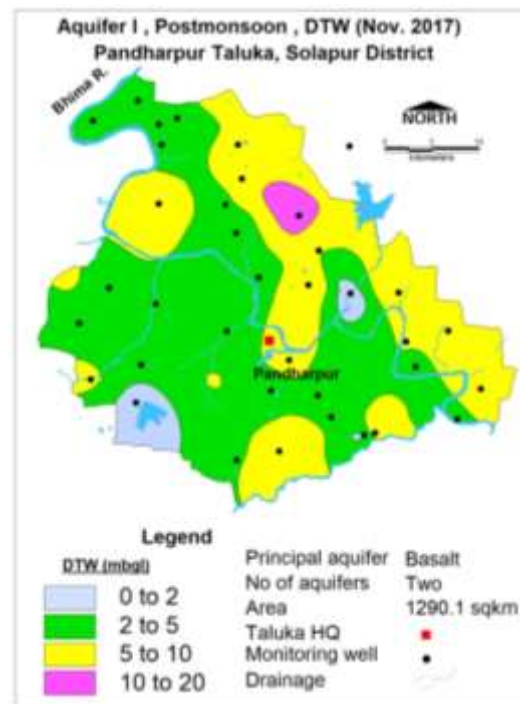
1. SALIENT INFORMATION	
1.1. introduction	
Taluka Name	Pandharpur
Geographical Area (Sq. Km.)	1292.8
Hilly Area (Sq. Km)	0.00
Saline Area (Sq. Km.)	0.00
Population (2011)	442368.00
Climate	Tropical
1.2 Rainfall Analysis	
Annual Rainfall (2017) (mm)	515.80
Decadal Average Annual Rainfall (2007-17) (mm)	509.1 mm
Normal Rainfall (mm)	610.4 mm
Long Term Rainfall Analysis (1901-2017)	Falling Trend -0.231 mm/year Normal/Excess Rainfall- 45% & 55%. (Moderate/Severe)-: 21 % Moderate & 4 % Severe.
Probability of Probability of Drought	
Rainfall Trend Analysis (1901 To 2017) EQUATION OF TREND LINE: $y = -0.2306x + 623.87$	
1.3. Geomorphology &Geology	
Geomorphic Unit	Plateau Undissected to highly Dissected, with weathered thickness ranging from 0 to 2 m Structural hills extended NW -SE.
Soil	In general, they are clayey loam in texture and fairly high in calcium carbonate, high porosity but moderate to low permeability, thus having low to moderate infiltration capacity. Based on physical characteristics the soils of the area have been classified into three major groups: Medium black soil, Red Sandy soils and Shallow black soils
Geology	Alluvium: sand/ silt and clay alternating beds Age: Recent to Sub-recent Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene
1.4. Hydrology & Drainage	

Hydrology	
Bigger Minor Irrigation Project (>100 Ha.)	Completed: -1 medium & 2 MI Tanks
Minor Irrigation Project (<100 Ha.)	Completed: -36 VT, 35 KT weirs & 60 DB
Drainage	The area is drain by Bhima rivers and its tributaries,flow from NW to SE direction in central part of the taluka
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern	
Geographical Area (Sq. Km.)	1292.8
Forest Area (Sq. Km.)	54.11
Net Sown Area (Sq. Km.)	1062.82
Double Cropped Area (Sq. Km.)	18.67
Gross Cropped Area (sq.km)	1081.49
Cultivable Area (Sq. Km.)	1185.41
Area under Irrigation (Sq. Km.)	
Ground Water	182.50
Surface Water	225.00
Principal Crops	Area (Sq. Km.)(Reference year 2013-14)
Wheat	75.36
Jawar	55.46
Bajra	12.48
Maize	39.07
Tur	18.79
Sugarcane	82.51
Chilli	4.16
Mango	3.01
Onion	4.39
Sunflower	28.06
1.6. Water Level Behaviour	
1.6.1.Phreatic Aquifer-Water Level	
Pre-Monsoon (May-2017)- Water level less than 10 mbgl has been observed in major parts of the Taluka while water level in the range of 10 to 20 mbgl is observed in northern part of the Taluka; deeper water level more than 20 mbgl has been observed in isolated patch around Talani village.	
Post-Monsoon (November-2017)- Water Level less than 5 mbgl has been observed in major parts of the Taluka while water level in the range of 5 to 10 mbgl is observed in northern part of the Taluka; deeper water level more than 20 mbgl has been observed at Medhapur.	

Pre-Monsoon Water Level (May 2017)



Post-Monsoon Water Level (Nov. 2016)

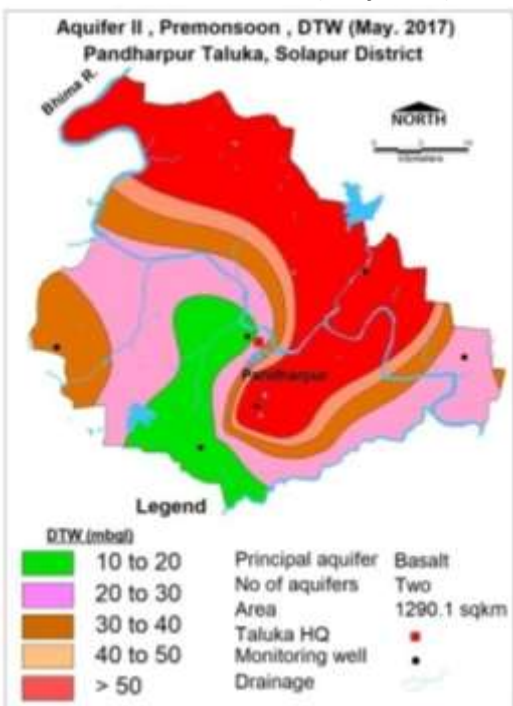


1.6.2. Semi-Confined/Confined Aquifer-Water Level

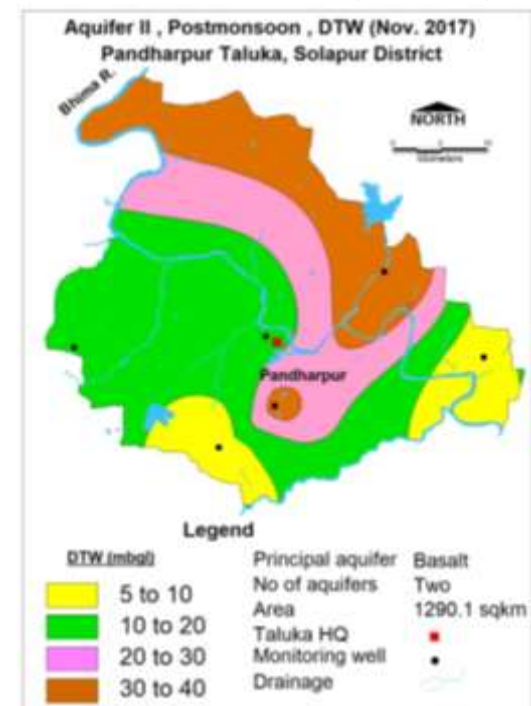
Pre-Monsoon (May-2016)- Water level > 20 mbgl is observed in south western part of the Taluka; water level between 20 to 30 mbgl is observed in major part of the Taluka while water level >30 mbgl is observed in northern and eastern parts of the Taluka.

Post-Monsoon (November-2017)- Water level <20 mbgl is observed in north eastern and south-western parts of the Taluka; 10 to 20 mbgl is observed in northwestern part of the Taluka while >20 mbgl is observed in north western part of the Taluka.

Pre-Monsoon Water Level (May 2017)



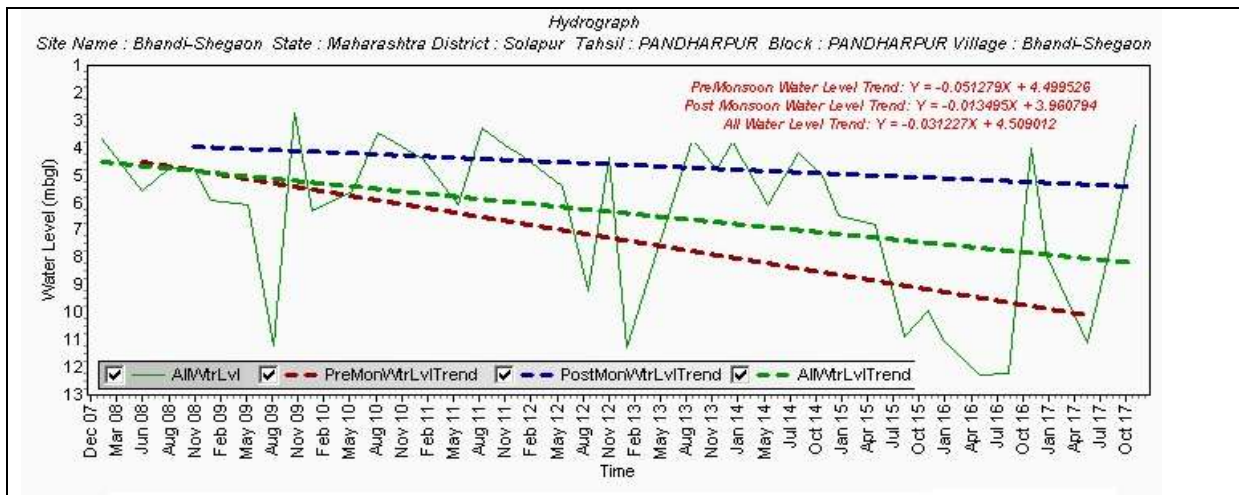
Post-Monsoon Water Level (Nov. 2017)



1.6.4. Hydrograph

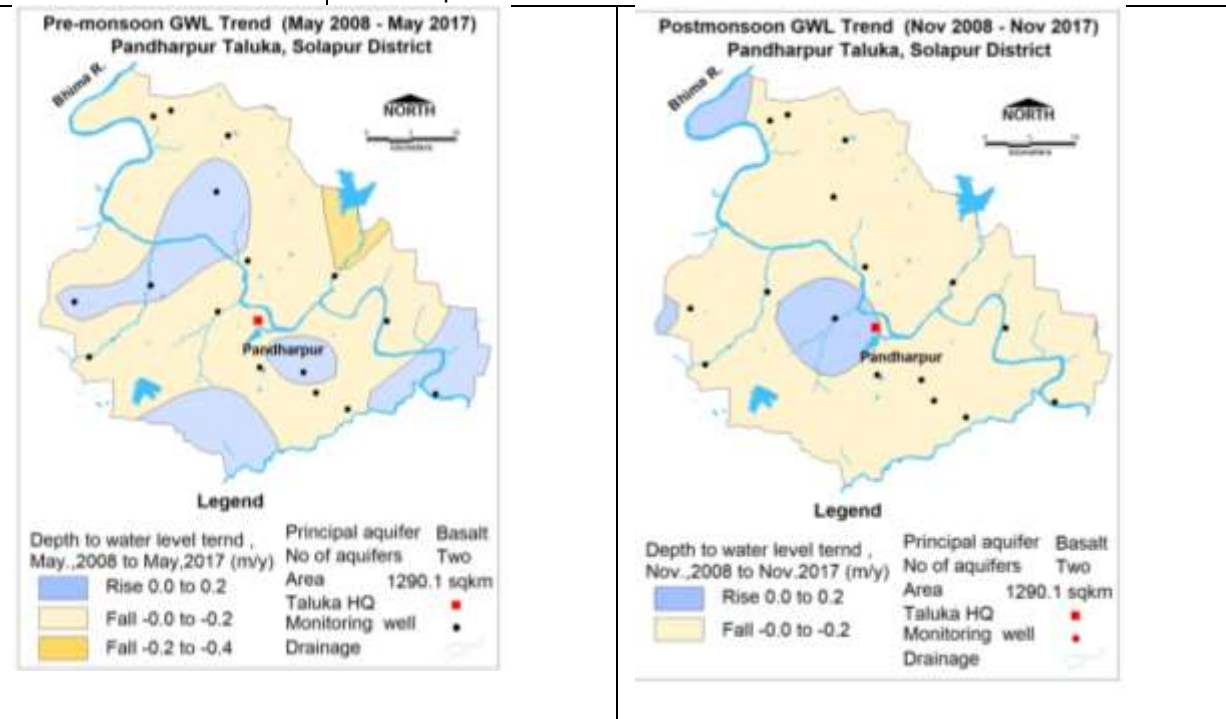
Hydrograph shows Pre-monsoon rising trend @ 0.38 m/year

Hydrograph shows Post-monsoon rising trend @ 0.135 m/year



1.6.3. Water Level Trend (2008-2017)

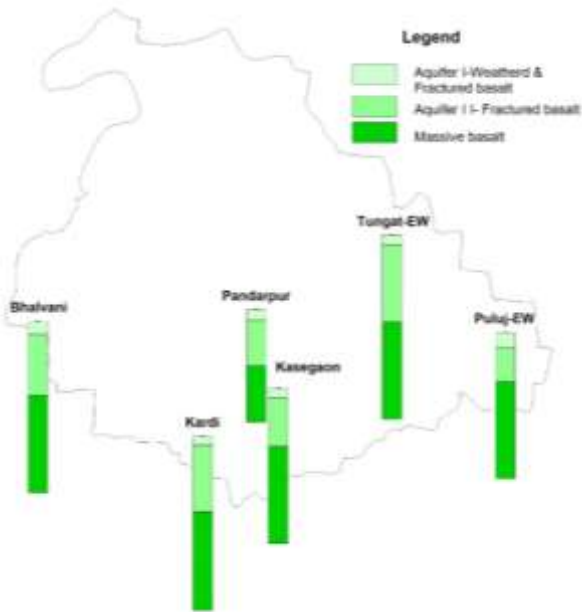
Pre-Monsoon trend	Rising 0.014 to 0.11 m/year
	Falling 0.02 to 0.2 m/year
	Declining trend up to 0.2 m/year is observed in almost entire Taluka; decline in water level >0.2 m/year small patch has been observed in northern part of the Taluka. Rising water level trend has been observed in small part in northern and southern parts and isolated part in western part of the Taluka.
Post-Monsoon trend	Rising 0.009 m/year
	Falling 0.0037 to 0.1 m/year
	Declining trend up to 0.2 m/year is observed in major part of the Taluka; Rising water level trend has been observed in central & southern in isolated part of the Taluka.



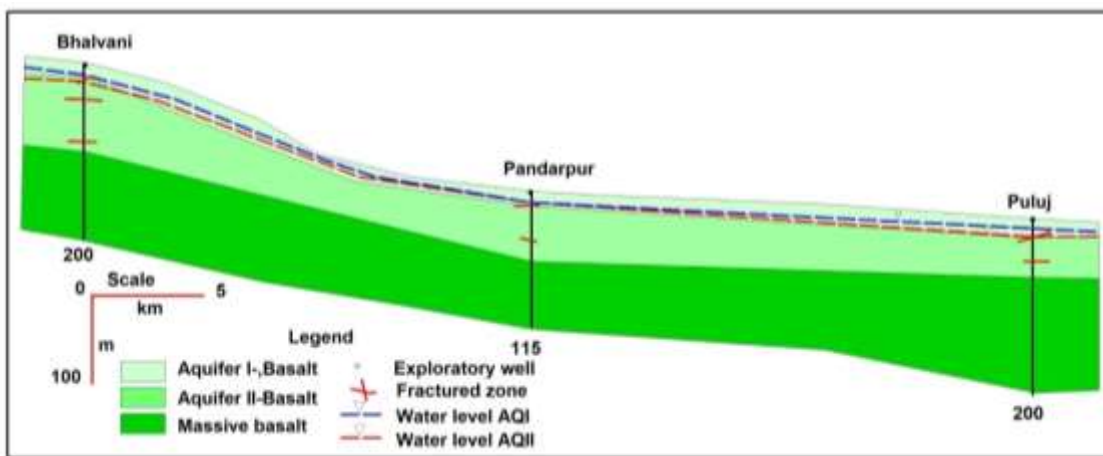
2. AQUIFER DISPOSITION

2.1. Number of Aquifers	Aquifer-I: Alluvium & Basalt	Aquifer-II: Basalt
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2.2. Bar Diagram



2.3. Cross Sections



2.4. Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)	
Type of Aquifer	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)
Depth of Occurrence (mbgl)	8 - 30	40 - 196
Thickness of wearherd /fractured rocks (m)	5 - 15	1.25 -9
Yield	10 - 100 m ³ /day	0.1 - 1.5 lps
Specific yield (Sy)	0.015 -0.02	0.0025
Storativity (S)		0.00057
Transmissivity (T) (m ² /day)	T: 5-30 m ² /day	T: 40 - 60 m ² /day

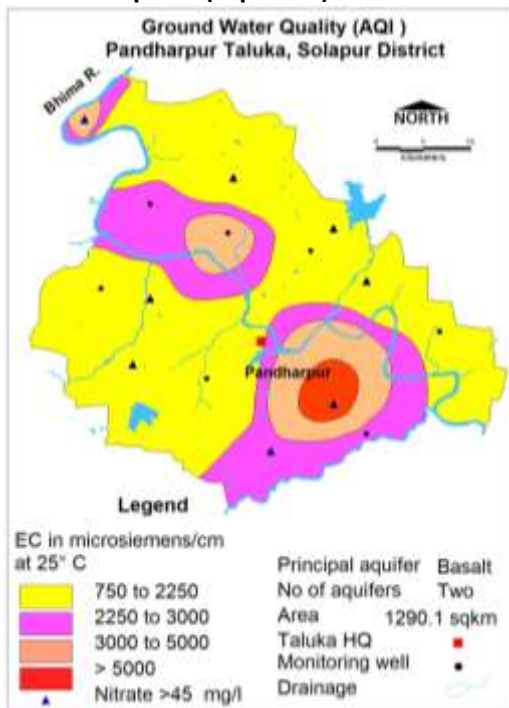
3. GROUND WATER QUALITY

3.1 Phreatic Aquifer (Aquifer-I): In general, the water quality of shallow aquifer in Karmala taluka is potable and good for drinking, domestic, industrial as well as irrigation purposes. Nitrate more than 45 mg per litre was detected in water sample from Palshi, Bhose, Rople, Talni, Ranzani, and Rople.

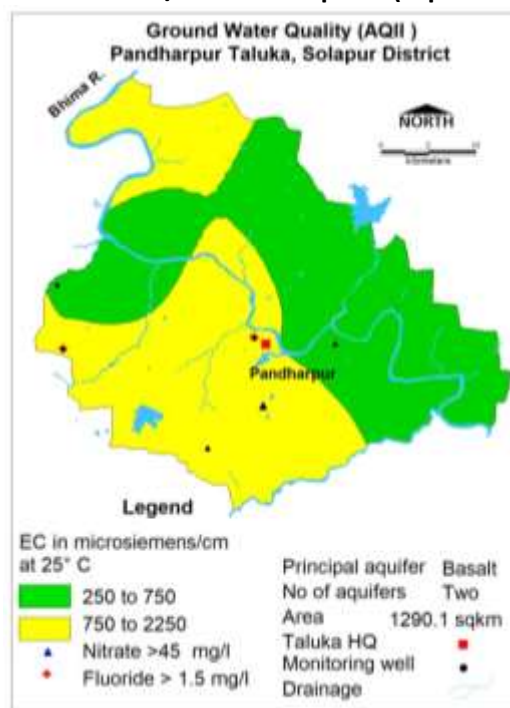
very high salinity prevails (>2250 $\mu\text{S}/\text{cm}$ at Ranzani), which is not suitable for drinking, domestic, industrial as well as irrigation purposes. Ground water can be used for drinking only after treatment and for irrigation for very high salt tolerant crops and with proper soil and crop management practices.

3.2: Semiconfined/Confined Aquifer (Aquifer II) : In general the water quality of deep aquifer in Karmala taluka is potable and very good for drinking, domestic, industrial as well as irrigation purposes. Nitrate more than 45 mg per litre was detected in water sample from Kasegaon EW & Fluoride more than 1.5 mg per litre was detected in water sample from Bhalwani and Pandharpur EW.

Phreatic Aquifer (Aquifer-I)



Semiconfined/Confined Aquifer (Aquifer II)



4. GROUND WATER ISSUE

Over - Exploitation Declining WL
Limited Aquifer Potential
Water Scarcity - lean period

5. GROUND WATER RESOURCE & EXTRACTION

5.1. Aquifer-I/ Phreatic Aquifer (Basalt & Alluvium)

Annual Extractable Ground Water Recharge (MCM)	139.67
Current Annual Ground Water Extraction for irrigation (MCM)	103.75
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	4.11
Current Annual Ground Water Extraction for All uses (MCM)	107.86
Annual GW Allocation for for Domestic Use as on 2025 (MCM)	4.68
Net Ground Water Availability for future use (MCM)	36.95
Stage of Ground Water Extraction (%))	77.22
Category	Semi Critical

5.2 Aquifer-II Semiconfined/Confined Aquifer (Basalt)

Area (sq.km)	Mean thickness (m)	Piezometric head (meter above bottom of	Sy	S	Resource above confining layer (mcm)	Resource in confining aquifer (mcm)	Total Resource (mcm)
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		confining layer)					
1297.116	5	60	0.005	2.66E-05	2.070197	32.4279	34.4981
6.0. GROUND WATER RESOURCE ENHANCEMENT							
Stage of GW Development	77.22%						
Annual Available Resource (MCM)	139.67						
Gross Annual Draft (MCM)	107.85						
6.1 SUPPLY (MCM)							
Agricultural Supply -GW	118.63						
Agricultural Supply -SW	-						
Domestic Supply - GW	4.11						
Domestic Supply - SW	1.03						
Total supply (MCM)	123.76						
6.2. Supply Side Management							
Geographical Area (sq.km)	1290.1						
Area feasible for recharge (sq. km.)	1052.92						
Unsaturated Volume (MCM)	2105.84						
Surplus water available for AR (MCM)	22.05						
Proposed Structures	Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)				Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)		
Number of Structures	77				221		
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	11.56				4.98		
Total recharged @ 75 % efficiency (MCM)	16.54						
Current Annual Resource Availability (MCM)	139.67						
Current Annual Groundwater Extraction (MCM)	107.85						
Total GW resource available after supply side intervention (MCM)	156.21						
Stage of GWD after supply side interventions (%)	69.04						
Ground water available TO BRING STAGE OF	1.49						

GWD UPTO 70%		
No. of farm ponds	0.00	
Volume of water available for harvesting	0.00	
No of waterbody in saline patch (Area more than 2.5 ha)	Nil	
Additional volume created by desilting	Nil	
RTRWH Structures – Urban Areas		
Households to be covered (25% with 50 m ² area)	22160.00	
Total RWH potential (MCM)	0.56	
Rainwater harvested / recharged @ 80% runoff co-efficient	0.45	May be implemented if economically viable
6.3. Demand Side Management		
Micro irrigation techniques - Area proposed to be covered under drip (sq.km)		
Sugarcane		2
Onion		0
Volume of Water expected to be saved with drip irrigation (MCM)		
Sugarcane		1.14
Onion		0
Total Volume of Water expected to be saved (MCM)		
		1.14
Total GW Draft after Demand side intervention		
		106.71
Stage of GWD after demand side interventions (%)		
		68.31
GWR available/required to bring the STAGE OF GWD to 70% (MCM)		
		2.63
Additional Area (sq.km.) proposed to be brought under assured GW irrigation		
		4.05
7.0. EXPECTED BENEFITS		
Annual Extractable Ground Water Recharge (MCM)		
		139.67
Current Annual Ground Water Extraction (MCM)		
		107.85
Water Recharged by Supply side intervention (MCM)		
		16.54
Water saving by demand side intervention (MCM)		
		1.14
Present Stage of Ground Water Extraction (%)		
		77.22
Ground water resources after supply side management (MCM)		
		156.21
Ground water Draft after demand side management (MCM)		
		106.71
Expected Stage of Ground Water Extraction after Supply and Demand side interventions (%)		
		68.31
8. DEVELOPMENT PLAN		
GW Resources Available for Development and Bring Stage of GWD upto 70% from present SOD		
		2.63
Proposed no. of DW (@ 1.5 ham for 90% of GWR Available)		
		158
Proposed no. of BW* (@ 1.5 ham for 10% of GWR Available)		
		18

Additional Area (sq.km.) proposed to be brought under assured Ground Water irrigation with av. CWR of 0.65 m with 70% Stage of GW Extraction

4.05

Proposed AR Structures

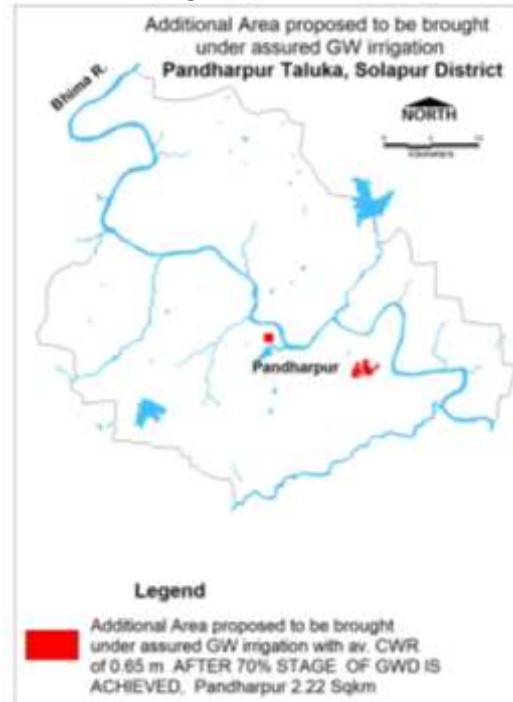
**Artificial Recharge Structure
Pandharpur Taluka, Solapur District**



Legend

Percolation tank	+	Principal aquifer	Basalt
Check dam	≡	No of aquifers	Two
		Area	1290.1 sqkm
		Taluka HQ	■
		Drainage	—

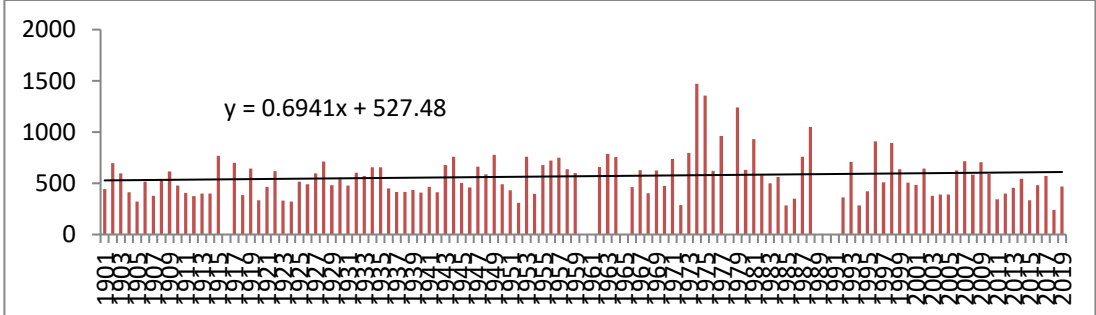
Additional area proposed to be bought under assured GW irrigation



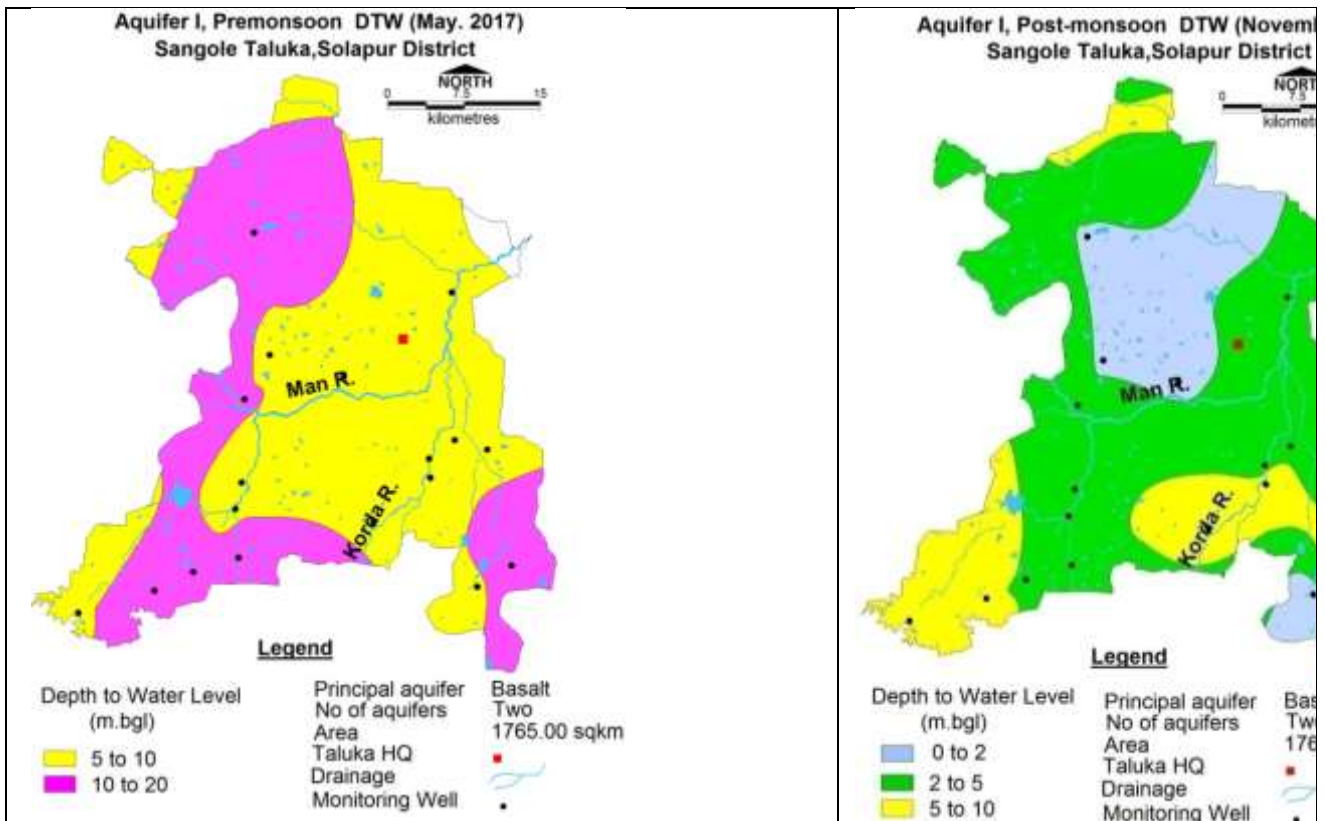
Legend

Additional Area proposed to be brought under assured GW irrigation with av. CWR of 0.65 m AFTER 70% STAGE OF GWD IS ACHIEVED. Pandharpur 2.22 Sqkm

9.9 SANGOLE TALUKA, SOLAPUR DISTRICT, MAHARASHTRA

1. SALIENT INFORMATION	
1.1. Introduction	
Taluka Name	Sangole
Geographical Area (Sq. Km.)	1567.1
Hilly Area (Sq. Km)	6.76
Saline Area (Sq. Km.)	0.00
Population (2011)	322845
Climate	Tropical
1.2 Rainfall Analysis	
Annual Rainfall (2019) (mm)	468.4
Decadal Average Annual Rainfall (2010-19) (mm)	532.3 mm
Normal Rainfall (mm)	537.3 mm
Long Term Rainfall Analysis (1901-2019)	Trend 0.694 mm/year Probability of Normal/Excess Rainfall- 55% & 24%. Probability of Drought (Moderate/Severe)-: 20 % Moderate & 1 % Severe.
Rainfall Trend Analysis (1901 To 2019) EQUATION OF TREND LINE: $y = 0.694x + 527.4$	
	
1.3. Geomorphology & Geology	
Geomorphic Unit	Major parts of the taluka is Plateau slightly to moderately Dissected (PLS and PLM), with weathered thickness ranging from 0 to 1 m with isolated hills (Mesa and Butte) and valley areas forming Plateau weathered (PLWS - 0 to 2m weathering). The plateau in the southern part of the taluka has steep slopes and escarpments.
Soil	In general, they are clayey loam in texture and fairly high in calcium carbonate, high porosity but moderate to low permeability, thus having low to moderate infiltration capacity. Based on physical characteristics the soils of the area have been classified into three major groups: Medium black soil, Red Sandy soils and Shallow black soils
Geology	Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene.
1.4. Hydrology & Drainage	
Hydrology	
Bigger Minor Irrigation Project (>100 Ha.)	Completed: 1 medium & 16 MI Tanks
Minor Irrigation Project (<100 Ha.)	Completed: 117 PT, 74 KT weirs & 57 DB

Drainage	The taluka falls in Bhima subbasin. The taluka is drained by Man River and its tributaries i.e., Khurdu (Korda) River, flowing from West to East direction.	
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern		
Geographical Area (Sq. Km.)	1567.1	
Forest Area (Sq. Km.)	6.8	
Net Sown Area (Sq. Km.)	643.8	
Double Cropped Area (Sq. Km.)	29.79	
Gross Cropped Area (sq.km)	673.59	
Cultivable Area (Sq. Km.)	1328.72	
Area under Irrigation (Sq. Km.)		
Ground Water	6.91	
Surface Water	N.A.	
Principal Crops	Area (Sq. Km.) (Reference year 2013-14)	
Wheat	18.73	
Jawar	438.96 (dry)	
Bajra	106.47 (dry)	
Maize	132.43 (dry)	
Gram	13.66 (dry)	
Sugarcane	49.23	
Grapes	80.68	
1.6. Water Level Behaviour		
1.6.1. Phreatic Aquifer-Water Level		
Pre-Monsoon (May-2017) - Water level ranges from 6.0 m.bgl at Pachegaon Kh to 15.9 mbgl at Hangirage. Water level in the range of 5 to 10 mbgl has been observed in major part of the taluka in the central and eastern part, while water level in the range of 10 to 20 mbgl is observed in the western and south-eastern, parts of the taluka.		
Post-Monsoon (November-2017) - Water level ranges from 1.4 m.bgl at Pare and Ajanale-Ligadewadi to 7.6 mbgl at Pachegaon Bk. Water level less than 2 m.bgl is observed in the central and north-eastern parts of the taluka. Water level in the range of 2 to 5 mbgl has been observed in major part of the taluka, and water level in the range of 5 to 10 mbgl is recorded in a patch in the south-western, south- and northern parts of the taluka.		
Pre-Monsoon Water Level (May 2017)		Post-Monsoon Water Level (Nov. 2017)

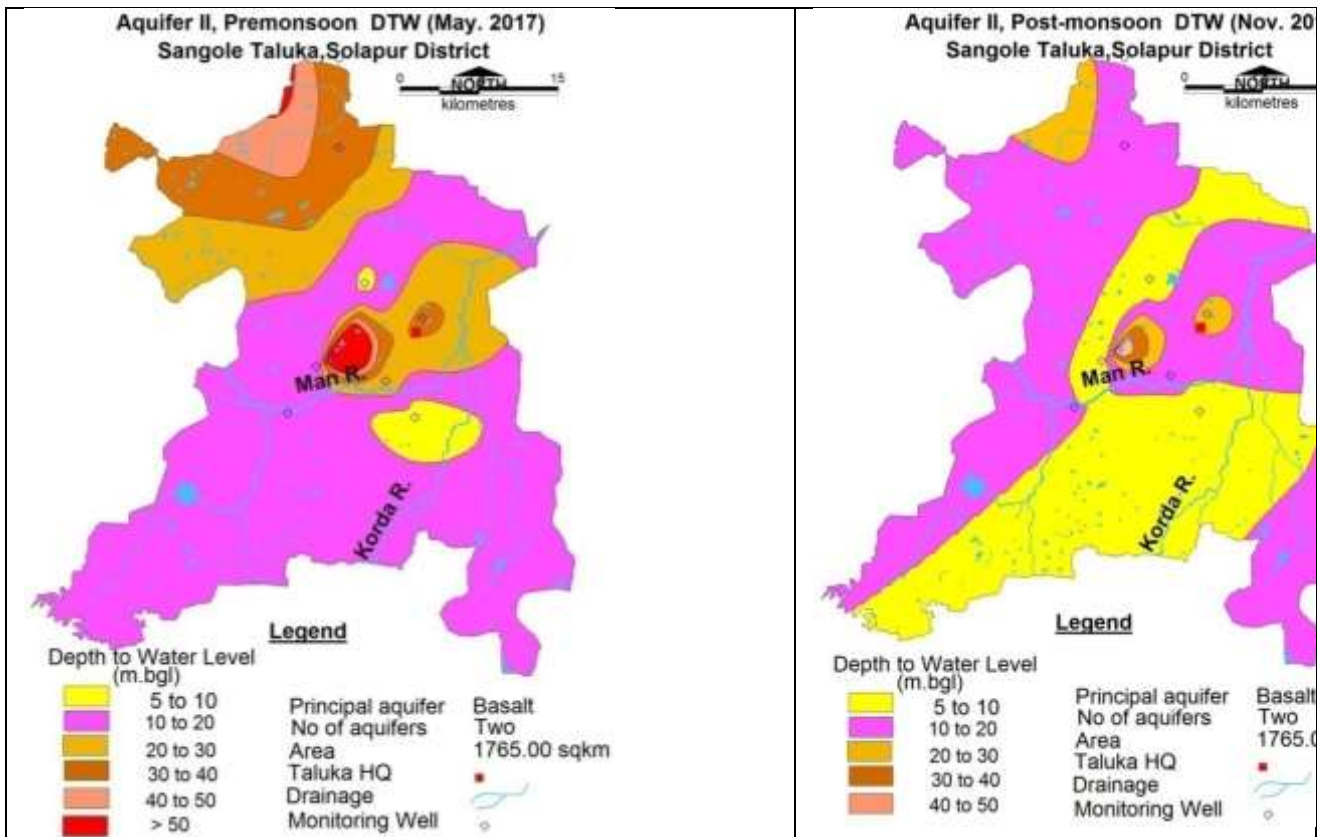


1.6.2. Semi-Confined/Confined Aquifer-Water Level

Pre-Monsoon (May-2017)- Water level shallower than 10 mbgl is observed in a small patch in east-central part and water level in the range of 10 to 20 mbgl is observed in major part of the taluka; deeper water level between 20 to 40 mbgl is observed in northern and central parts of the taluka. Water level deeper than 50 mbgl is observed in very small patches in central and northern parts of the taluka.

Post-Monsoon (November-2017)- Shallow water level <10 mbgl is observed in major parts of the taluka; water level in the range of 10 to 50 mbgl is observed in very small patches in central and northern parts of the taluka.

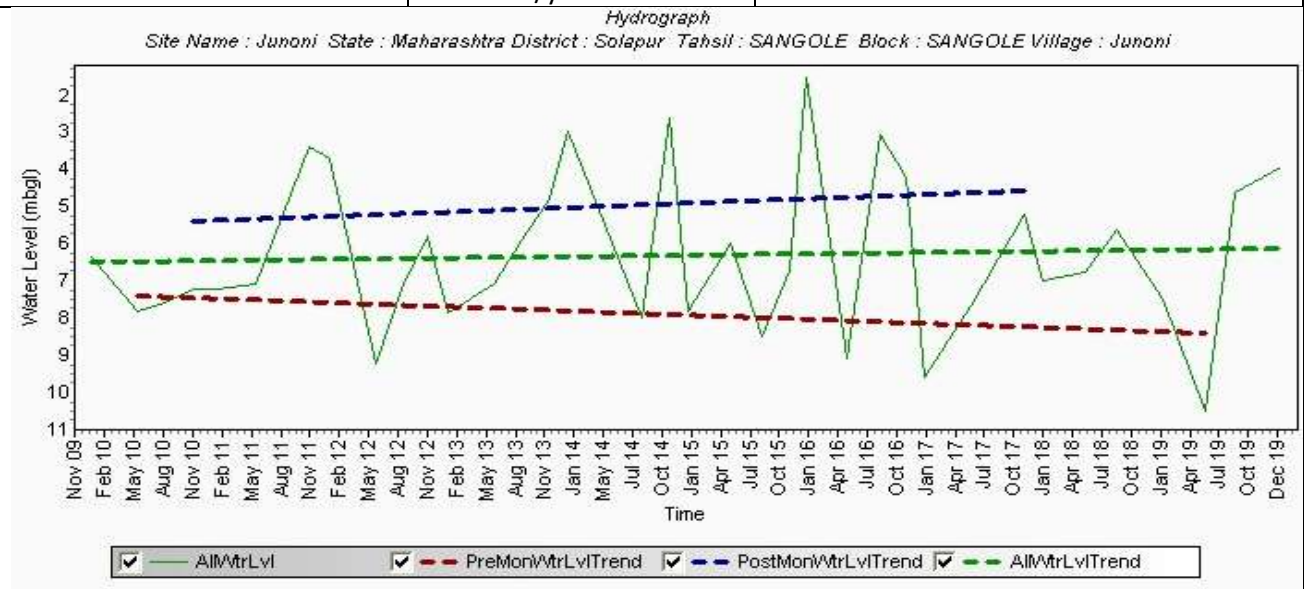
<p>Pre-Monsoon Water Level (May 2017)</p>	<p>Post-Monsoon Water Level (Nov. 2017)</p>
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1.6.4. Hydrograph

Hydrograph shows Pre-monsoon falling trend @ 0.0091 m/year

Hydrograph shows Post-monsoon rising trend @ 0.0093 m/year



1.6.3. Water Level Trend (2008-2017)

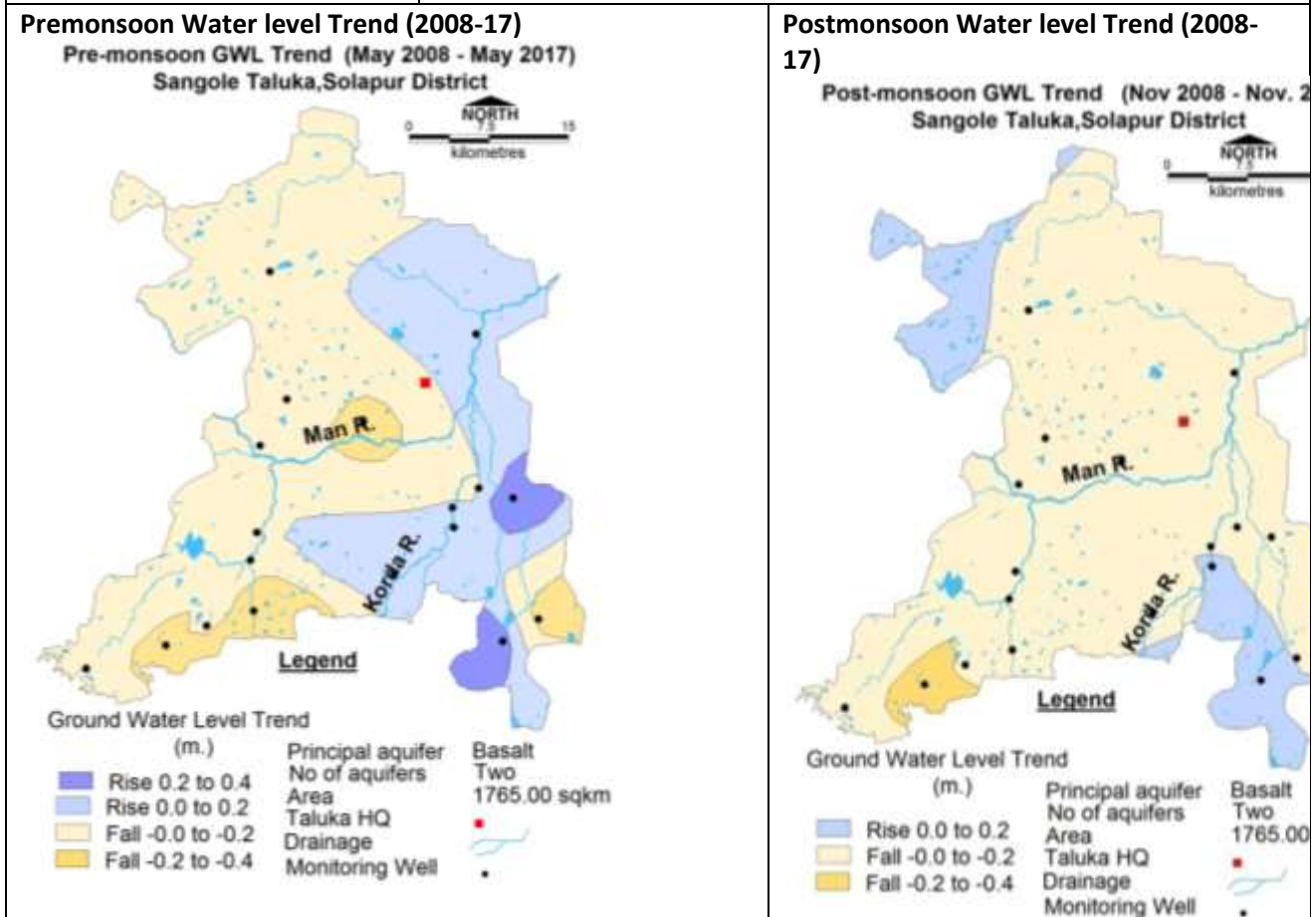
Pre-Monsoon trend

Rising: 0.00042 m/year at Ajanale-Ligadewadi to 0.37653 m/year at Jujarpur

Falling: 0.00105 m/year at Pachegaon Kh to 0.34184 m/year at Rajapur

Rising water level trend up to 0.2 m/year is observed in eastern and south-eastern parts, while rise in the range of 0.2 to 0.4 m is recorded in small patches in east-centra and southern parts of the taluka; Declining water level trend up to 0.2 m/year has been observed in major part of the taluka, while small patches in the central, southern and south-

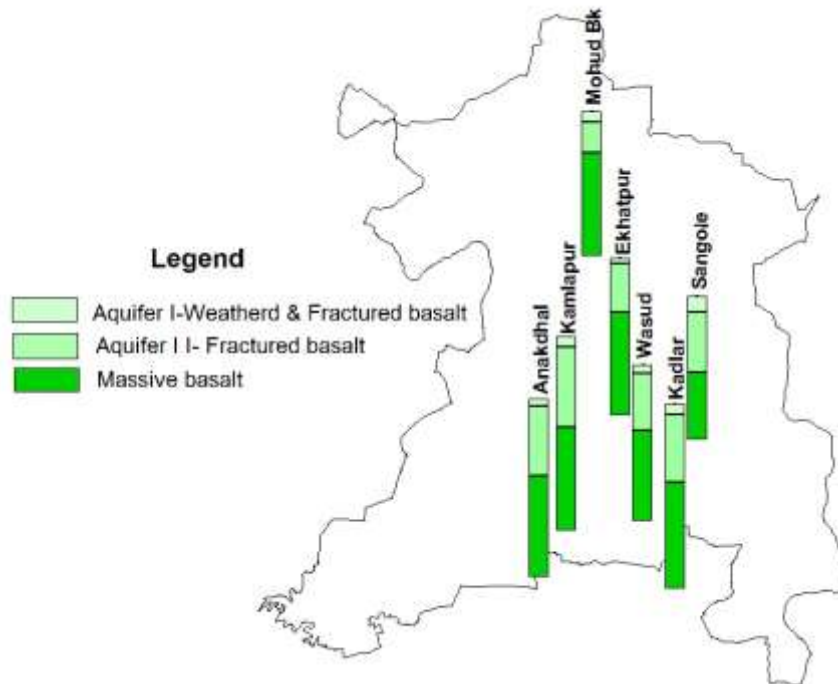
	eastern parts has experienced falling trend in the range of 0.2 to 0.4 m, in water level.
Post-Monsoon trend	Rising: 0.00977 m/year at Bamani to 0.37535 m/year at Tippehali.
	Falling: 0.14596 m/year at Dongargaon to 0.15202 m/year at Pare..
	Falling water level trend up to 0.2 m/year is observed in entire taluka and a small patch in the south-western part of the taluka shows decline in the range of 0.2 to 0.4 m. Rising water level trend up to 0.2 m/year has been observed in north-western and south-eastern partsof the taluka.



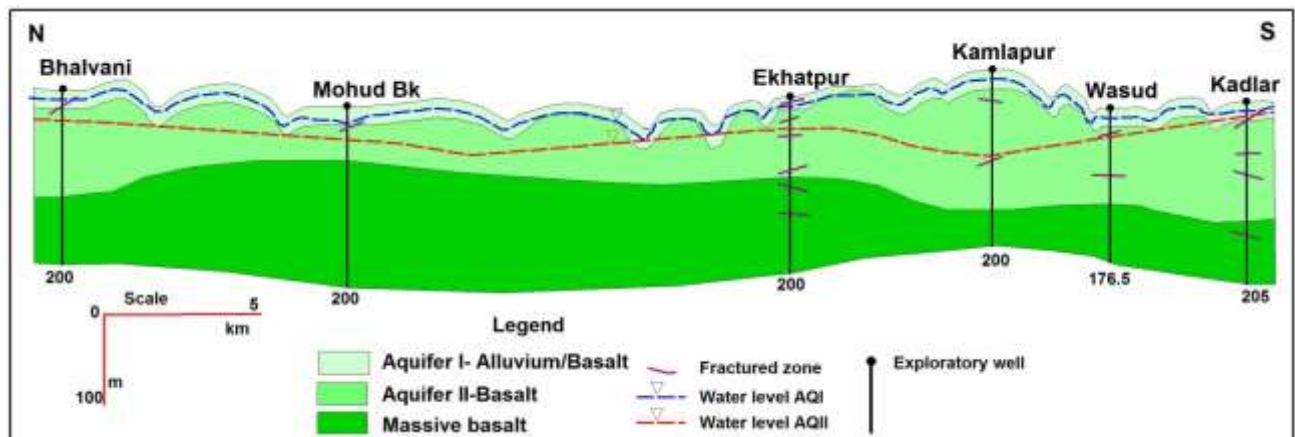
2. AQUIFER DISPOSITION

2.1. Number of Aquifers	Aquifer-I-Basalt	Aquifer-II-Basalt
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2.2. Bar Diagram



2.3. Cross Sections



2.4. Aquifer Characteristics

Major Aquifers	Basalt	Basalt
Type of Aquifer	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)
Depth of Occurrence (mbgl)	8 - 30	60 - 189
Thickness of weathered /fracture rocks (m)	5 - 15	1.25 - 11
Yield	10 - 100 m ³ /day	0.1 - 10 lps
Specific yield (Sy)	0.018- 0.02	0.005
Storativity (S)		0.0000145
Transmissivity (T) (m ² /day)	T: 5-20 m ² /day	T: 30-70 m ² /day

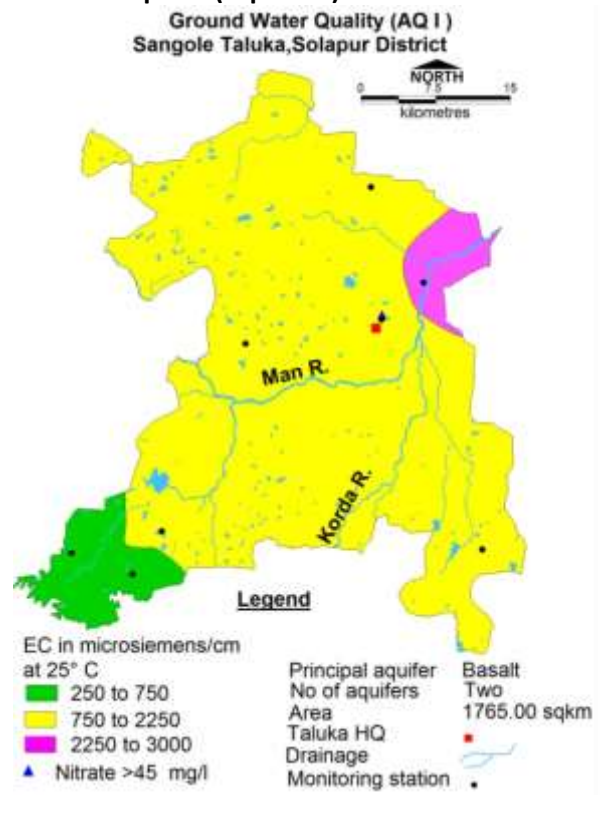
3. GROUND WATER QUALITY

3.1 Phreatic Aquifer (Aquifer-I) : In general the water quality of shallow aquifer in Sangole taluka is potable and good for drinking, domestic, industrial as well as irrigation purposes. Nitrate more than 45 mg per litre was detected in water sample from Sangola. Very high salinity (>2250 $\mu\text{S}/\text{cm}$) prevails at Bamni and Wakishivane, which is not suitable for drinking, domestic, industrial as well as irrigation purposes. Ground water can be used for drinking only after treatment and for irrigation for very high salt tolerant

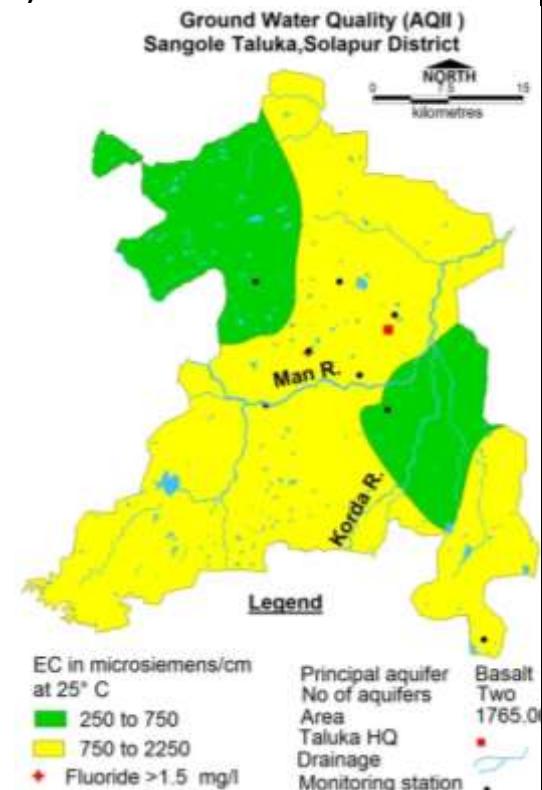
crops and with proper soil and crop management practices.

3.2: Semiconfined/Confined Aquifer (Aquifer II): In general the water quality of deep aquifer in Sangole taluka is potable and very good for drinking, domestic, industrial as well as irrigation purposes. Fluoride more than 1.5 mg per litre was detected in water sample from Kamlapur EW.

Phreatic Aquifer (Aquifer-I)



Semiconfined/Confined Aquifer (Aquifer II)



4. GROUND WATER ISSUES

Low ground water development,
Limited Aquifer Potential
Water Scarcity - lean period

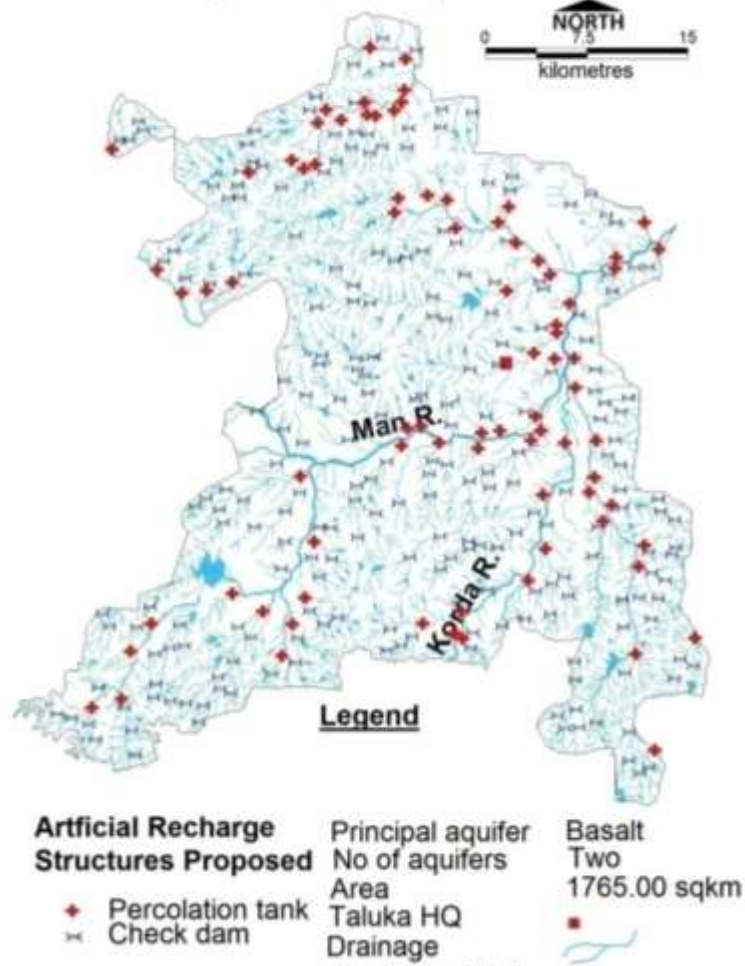
5. GROUND WATER RESOURCE & EXTRACTION

5.1. Aquifer-I/ Phreatic Aquifer (Basalt)

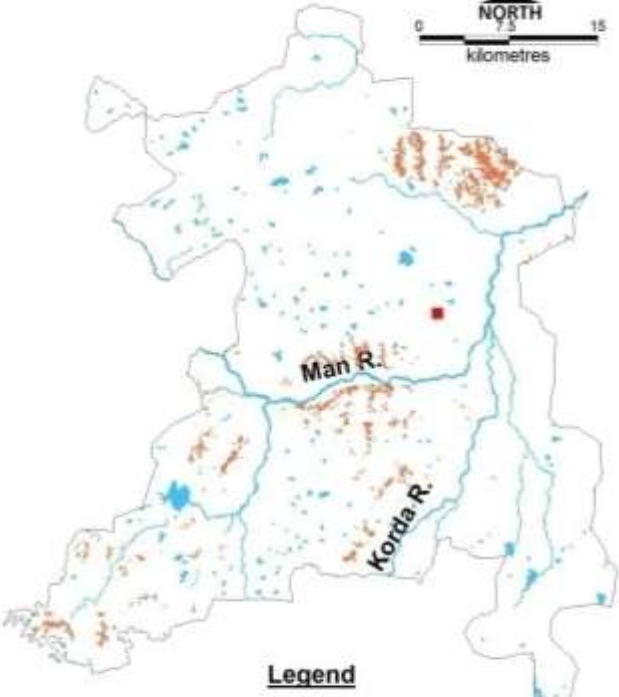

Ground Water Recharge Worthy Area (Sq. Km.)	1765.00
Total Annual Ground Water Recharge (MCM)	148.55
Natural Discharge (MCM)	8.08
Net Annual Ground Water Availability (Annual Extractable Ground Water Recharge) (MCM)	140.47
Existing Gross Ground Water Extraction for irrigation (MCM)	100.89
Existing Gross Ground Water Extraction for domestic and industrial water supply (MCM)	6.22
Existing Gross Ground Water Extraction for All uses (MCM)	107.11
Provision for domestic and industrial requirement supply to 2025(MCM)	7.83
Net Ground Water Availability for future irrigation development (MCM)	31.84
Stage of Ground Water Development (%)	76.25
Category	SEMI CRITICAL

5.2 Aquifer-II - Semiconfined/Confined Aquifer (Basalt)							
Area (sq.km)	Mean thickness (m)	Piezometric head (meter above bottom of confining layer)	Sy	S	Resource above confining layer (mcm)	Resource in confining aquifer (mcm)	Total Resource (mcm)
1765.624	1.25 to 9	55 to 90	0.005	1.5E-05	42.2504	1.68127	43.9316
6.0. GROUND WATER RESOURCE ENHANCEMENT							
Stage of GW Development			76.25				
Annual Available Resource (MCM)			140.47				
Gross Annual Draft (MCM)			107.11				
6.1 SUPPLY (MCM)							
Agricultural Supply -GW			100.89				
Agricultural Supply -SW			14.07				
Domestic Supply - GW			6.22				
Domestic Supply - SW			1.555				
Total supply (MCM)			122.74				
6.2. Supply Side Management - Rainwater Harvesting and Artificial Recharge							
Geographical Area (sq.km)			1771.76				
Area feasible for recharge (sq. km.)			950.44				
Unsaturated Volume (MCM)			1900.88				
Surplus water available for AR (MCM)			23.28				
Proposed Structures			Percolation Tank (@ Rs.150 lakh, Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)		Check Dam (@ Rs.30 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)		
Number of Structures			81		233		
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)			12.19		5.27		
Total recharged @ 75 % efficiency (MCM)			17.46				
Current Annual Resource Availability (MCM)			140.47				
Current Annual Groundwater Extraction (MCM)			107.11				
Total GW resource available after supply side intervention (MCM)			157.93				
Stage of GWD after supply side interventions (%)			67.82				
Ground water available TO BRING STAGE OF GWD UPTO 70%			3.44				

**Artificial Recharge
Sangole Taluka, Solapur District**



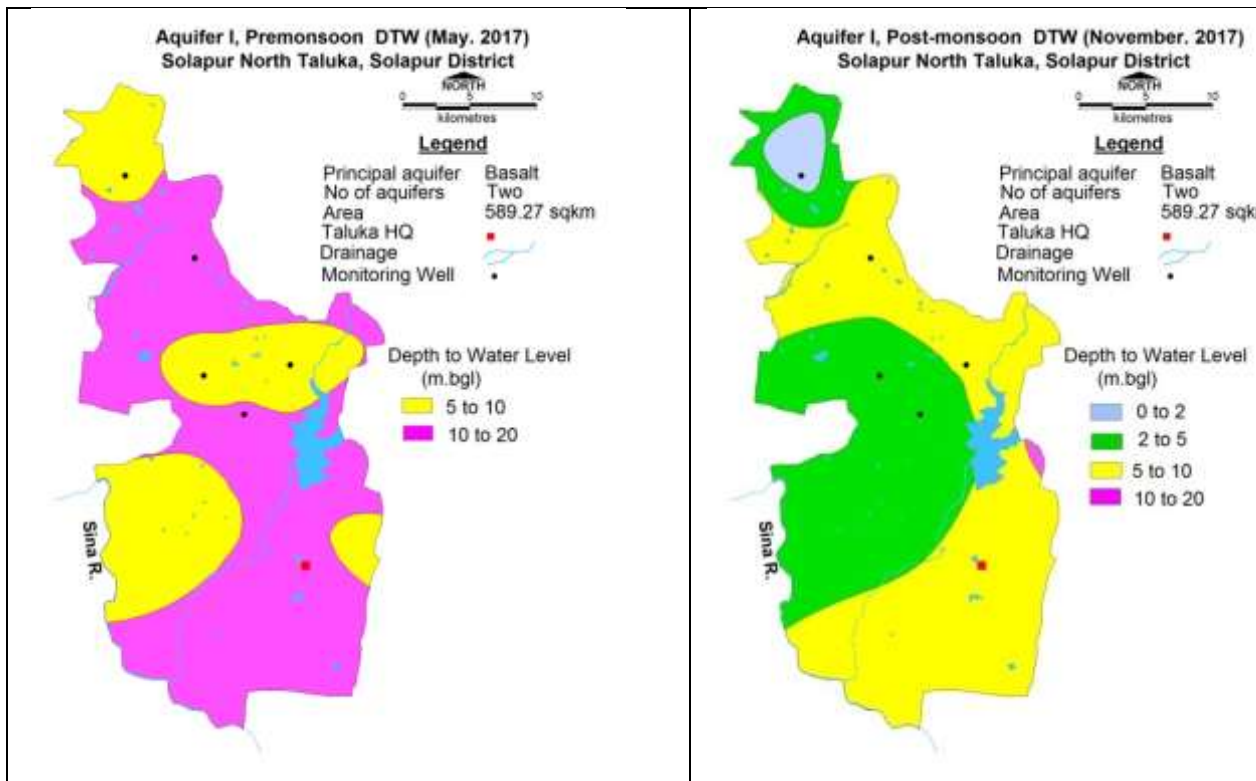
RTRWH - Urban Areas	May be implemented if economically viable
Households to be covered (10% with 50 m ² considering roof top area)	20995
Total RWH potential (MCM)	0.59
Rainwater harvested / recharged @ 80% runoff co-efficient	0.47
Micro irrigation techniques - Area proposed to be covered under drip (sq.km)	
Sugarcane	35
Onion	0
Volume of Water expected to be saved with drip irrigation (MCM)	
Sugarcane	19.95
Onion	0
Total Volume of Water expected to be saved (MCM)	19.95
Total GW Draft after Demand side intervention	87.16
Stage of GWD after demand side interventions (%)	55.19
GWR available/required to bring the STAGE OF GWD to 70% (MCM)	23.39
Additional Area (sq.km.) proposed to be brought under assured GW irrigation	35.98

<p style="text-align: center;">DEMAND SIDE INTERVENTION Sangole Taluka, Solapur District</p>  <p style="text-align: center;">Legend</p> <p>■ Sugarcane crop area proposed to be covered under drip irrigation In Sangole Taluka 35 Sq.Km</p> <p>Principal aquifer Basalt No of aquifers Two Area 1765.00 sqkm Taluka HQ ■ Drainage —</p>	<p style="text-align: center;">ADDITIONAL AREA PROPOSED TO BE BROUGHT UNDER ASSURED GW IRRIGATION Sangole Taluka, Solapur District</p>  <p style="text-align: center;">Legend</p> <p>■ Additional Area proposed to be brought under assured Ground Water irrigation with av. CWR of 0.65 m with 70% Stage of GW Extraction In Sangole Taluka 43.94 Sq Km</p> <p>Principal aquifer Basalt No of aquifers Two Area 1765.00 sqkm Taluka HQ ■ Drainage —</p>
Proposed Cropping Pattern change Irrigated area under Water Intensive Crop(ha)	Not Proposed
Water Saving by Change in Cropping Pattern	Nil
7.0. EXPECTED BENEFITS	
Annual Extractable Ground Water Recharge (MCM)	140.47
Current Annual Ground Water Extraction (MCM)	107.11
Water Recharged by Supply side intervention (MCM)	11.03
Water saving by demand side intervention (MCM)	1.71
Present Stage of Ground Water Extraction (%)	76.25
Ground water resources after supply side management (MCM)	151.49
Ground water Draft after demand side management (MCM)	87.16
Expected Stage of Ground Water Extraction after Supply and Demand side interventions (%)	55.19
8. DEVELOPMENT PLAN	
GW Resources Available for Development and Bring Stage of GWD upto 70% from present SOD	23.39
Proposed no. of DW (@ 1.5 ham for 90% of GWR Available)	1403
Proposed no. of BW* (@ 1.5 ham for 10% of GWR Available)	156
Additional Area (sq.km.) proposed to be brought under assured Ground Water irrigation with av. CWR of 0.65 m with 70% Stage of GW Extraction	35.98

9.10 NORTH SOLAPUR TALUKA, SOLAPUR DISTRICT, MAHARASHTRA

1. SALIENT INFORMATION	
1.1. Introduction	
Block Name	North Solapur
Geographical Area (Sq. Km.)	695.42
Hilly Area (Sq. Km)	0.00
Saline Area (Sq. Km.)	0.00
Population (2011)	1057352
Climate	Tropical
1.2 Rainfall Analysis	
Annual Rainfall (2019)(mm)	628.8
Decadal Average Annual Rainfall ((2010-19)) (mm)	521.7 mm
Normal Rainfall (mm)	699.1 mm
Long Term Rainfall Analysis(1901-2019)	Falling Trend -0.443 mm/year Probability of Normal/Excess Rainfall- 60% & 17%. Probability of Drought (Moderate/Severe)-: 19 % Moderate & 4% Severe.
Rainfall Trend Analysis (1901 To 2019) EQUATION OF TREND LINE: $y = -0.443x + 712.3$	
1.3. Geomorphology &Geology	
Geomorphic Unit	Major parts of the taluka is Plateau slightly to moderately Dissected (PLS and PLM), with weathered thickness ranging from 0 to 1 m with isolated hills (Mesa and Butte) and valley areas forming Plateau weathered (PLWS - 0 to 2m weathering). A small area in the Northern part Alluvial Plain (AYM) partly under Canal Command (APC)
Soil	In general, they are clayey loam in texture and fairly high in calcium carbonate, high porosity but moderate to low permeability, thus having low to moderate infiltration capacity. Based on physical characteristics the soils of the area have been classified into three major groups: Medium black soil, Red Sandy soils and Shallow black soils
Geology	Alluvium: sand/ silt and clay alternating beds Age: Recent to Sub-recent Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene
1.4. Hydrology & Drainage	
Hydrology	

Bigger Minor Irrigation Project (>100 Ha.)	Completed: 1 medium & 2 MI Tanks
Minor Irrigation Project (<100 Ha.)	Completed: 57 PT, 55 KT weirs & 16 DB
Drainage	The taluka falls in Bhima subbasin. The taluka is drained by Sina River and its tributaries, flowing southwards.
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern	
Geographical Area (Sq. Km.)	695.42
Forest Area (Sq. Km.)	21.33
Net Sown Area (Sq. Km.)	506.56
Double Cropped Area (Sq. Km.)	55.62
Gross Cropped Area (sq.km)	562.18
Cultivable Area (Sq. Km.)	673.44
Area under Irrigation (Sq. Km.)	
Ground Water	8.22
Surface Water	11.71
Principal Crops	Area (Sq. Km.) (Reference year 2013-14)
Wheat	43.27
Jawar	249.07 (dry)
Maize	3.94 (dry)
Tur	8.72 (dry)
Sugarcane	38.97
Mango	2.60
Grapes	5.70
Onion	20.24
1.6. Water Level Behaviour	
1.6.1. Phreatic Aquifer-Water Level	
Pre-Monsoon (May-2017) - Water level ranges from 7.85 m.bgl at Mardi to 13.9 mbgl at Wadala. Water level in the range of 5 to 10 mbgl has been observed in patches in northern, central, south-western and south-eastern parts of the taluka. Water level in the range of 10 to 20 mbgl has been observed in major part of the taluka.	
Post-Monsoon (November-2017) - Water level ranges from 1.3 m.bgl at Kalman to 6.9 mbgl at Wadala. Water level less than 2 m.bgl is observed in the northern part of the taluka. Water level in the range of 2 to 5 mbgl has been observed in northern and west-central parts of the taluka, and water level in the range of 5 to 10 mbgl is recorded in major part of the taluka.	
Pre-Monsoon Water Level (May 2017)	Post-Monsoon Water Level (Nov. 2017)



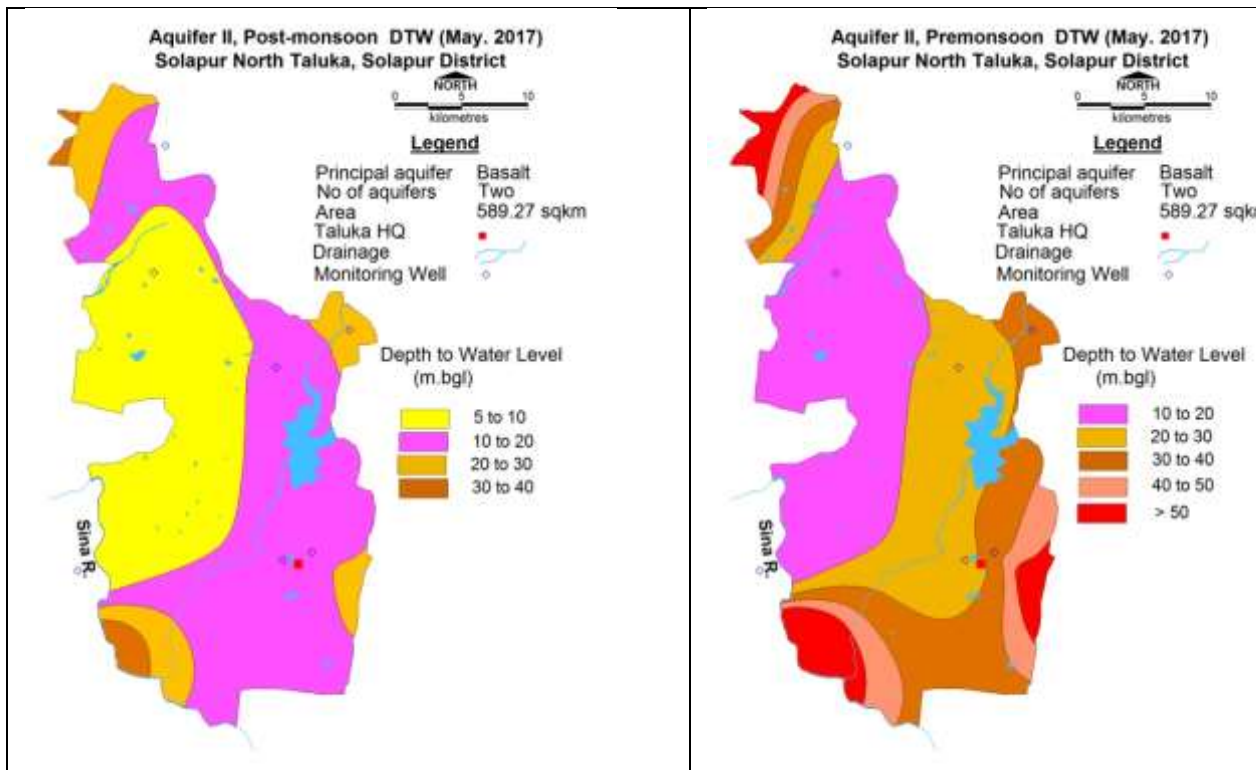
1.6.2. Semi-Confined/Confined Aquifer-Water Level

Pre-Monsoon (May-2017)- Water level in the range of 5 to 10 mbgl has been observed in a large area in west-central, part of the taluka. Water level in the range of 10 to 20 mbgl has been observed in major part of the taluka, while Water level in the range of 20 to 40 mbgl has been observed in patches in northern, east-central, south- western and south-eastern parts of the taluka.

Post-Monsoon (November-2017)- Water level in the range of 10 to 20 mbgl has been observed in a large area in west-central, part of the taluka. Water level in the range of 20 to 50 mbgl has been observed in major part of the taluka, while Water level in deeper than 50 mbgl has been observed in patches in northern, south- western and south-eastern parts of the taluka.

Pre-Monsoon Water Level (May 2017)

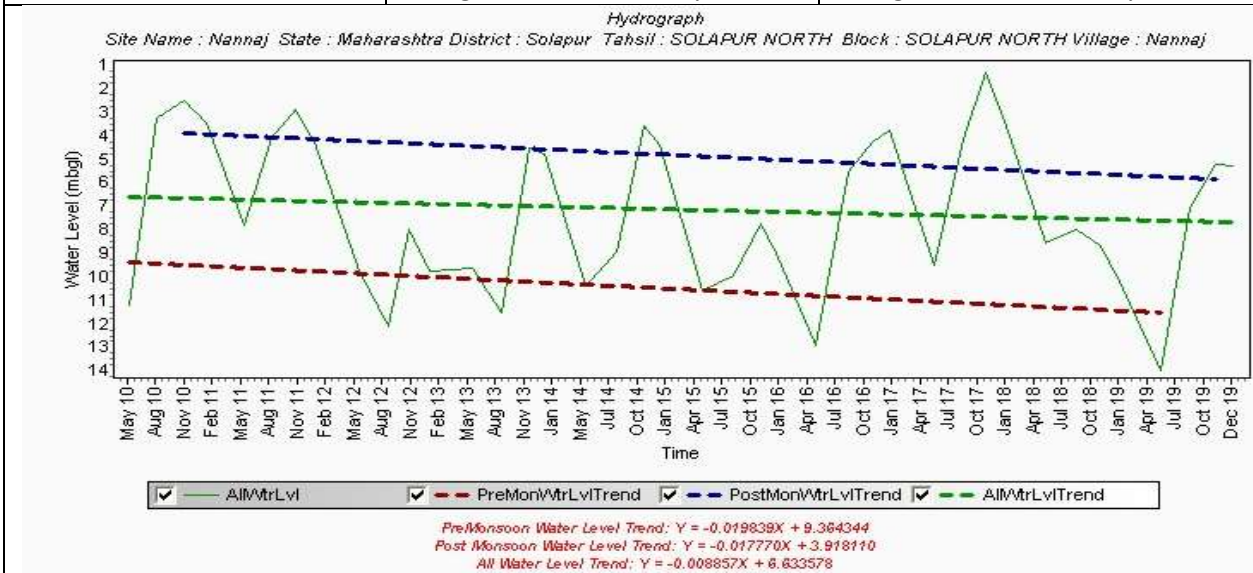
Post-Monsoon Water Level (Nov. 2017)



1.6.4. Hydrograph

Hydrograph shows Pre-monsoon falling trend @ 0.015 m/year

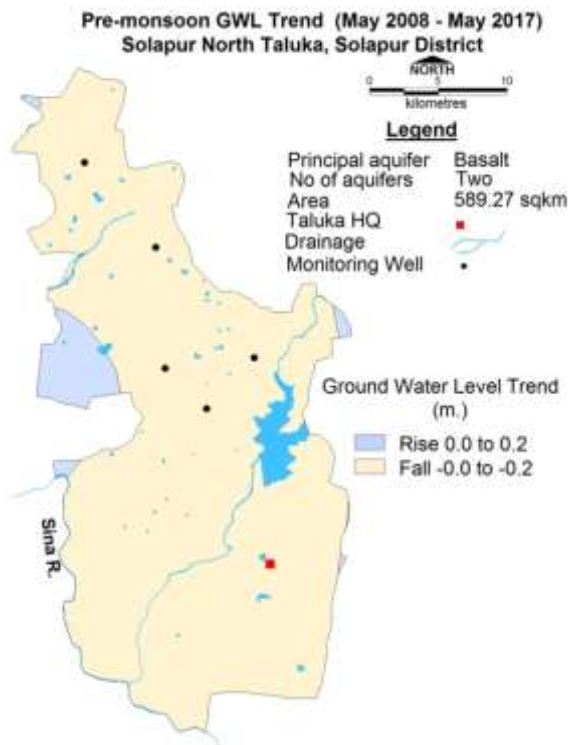
Hydrograph shows Post-monsoon falling trend @ 0.003 m/year



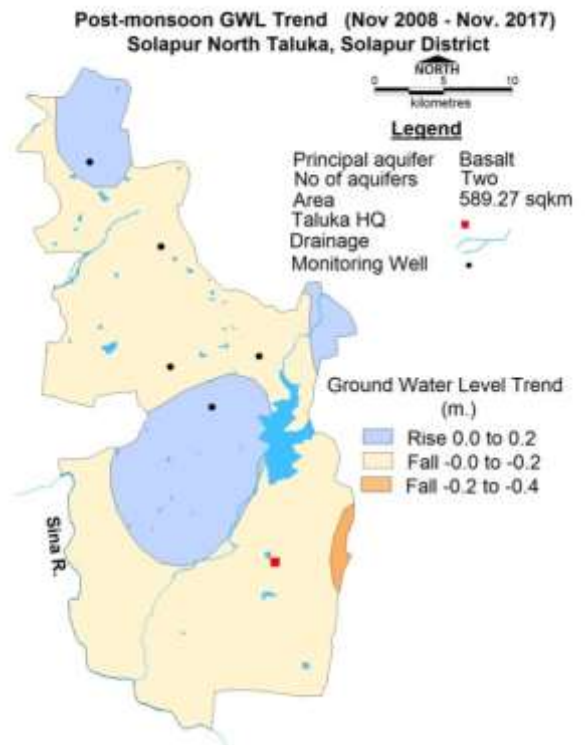
1.6.3. Water Level Trend (2008-2017)

Pre-Monsoon trend	Rising: 0.04529 m/year at Kalman to 0.18706 m/year at Karamba
	Falling: Nil
	Falling water level trend up to 0.2 m/year is observed in entire taluka, except very small patches in the west-central and east-central parts of the taluka, where rising water level trend up to 0.2 m/year has been observed.
Post-Monsoon trend	Rising: 0.10192 m/year at Akolekati to 0.09252 m/year at Wadala.
	Falling: 0.05645 m/year at Kalmanto 0.07517 m/year at Karamba.
	Falling water level trend up to 0.2 m/year is observed in entire taluka, except around patches in northern and central part of the taluka, where rising water level trend up to 0.2 m/year has been observed.

Premonsoon Water level Trend (2008-17)



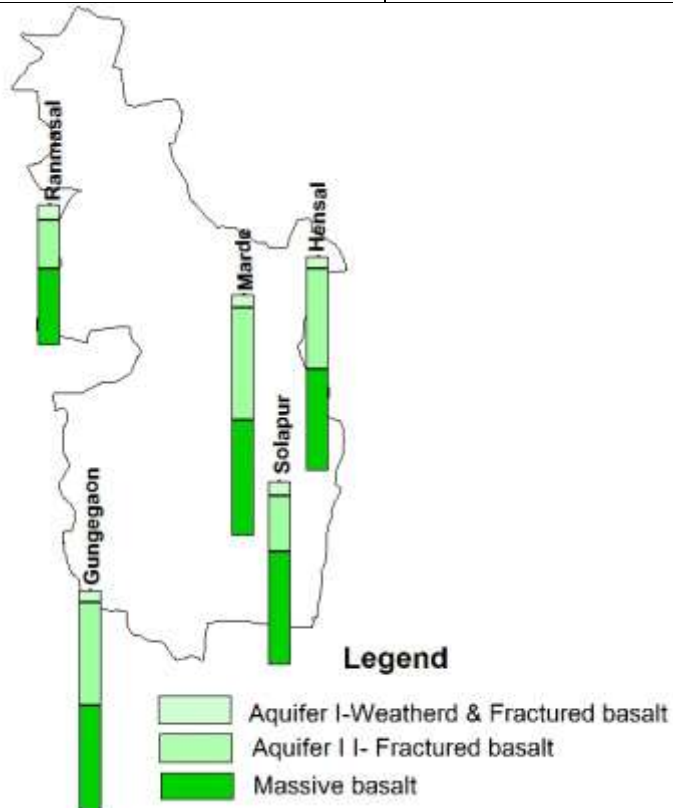
Postmonsoon Water level Trend (2008-17)



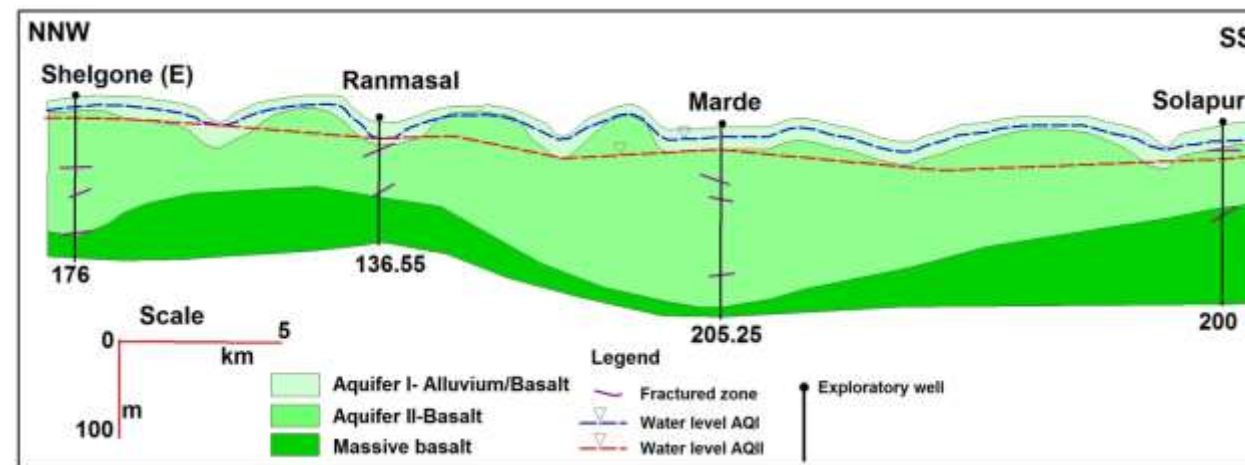
2. AQUIFER DISPOSITION

2.1. Number of Aquifers	Aquifer-I-Basalt	Aquifer-II-Basalt
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2.2. Bar Diagram



2.3. Cross Sections



2.4. Aquifer Characteristics

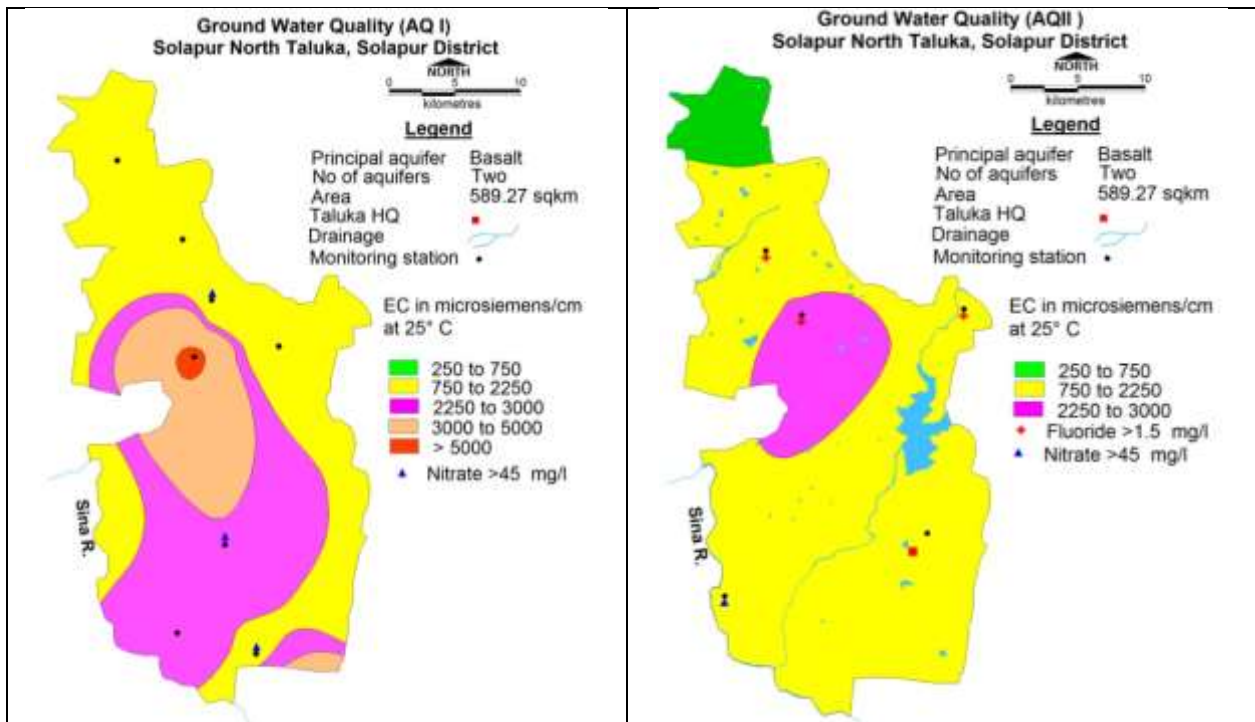
Major Aquifers	Basalt	Basalt
Type of Aquifer	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)
Depth of Occurrence (mbgl)	8 - 30	40 - 197
Thickness of weathered /fractured rocks (m)	5 - 15	1.25 - 11
Yield	10 - 100 m ³ /day	0.1 - 10 lps
Specific yield (Sy)	0.018- 0.02	0.0025
Storativity (S)		0.000012 to 0.0000145
Transmissivity (T) (m ² /day)	T: 5-20 m ² /day	T: 30-70 m ² /day

3. GROUND WATER QUALITY

3.1 Phreatic Aquifer (Aquifer-I): In general the water quality of shallow aquifer in North Solapur taluka is potable and good for drinking, domestic, industrial as well as irrigation purposes. Nitrate more than 45 mg per litre was detected in water sample from Soregaon and Nannaj. Very high salinity prevails (>2250 μ S/cm at Dongaon, Degaon and Akole kathi, which is not suitable for drinking, domestic, industrial as well as irrigation purposes. Ground water can be used for drinking only after treatment and for irrigation for very high salt tolerant crops and with proper soil and crop management practices.

3.2: Semiconfined/Confined Aquifer (Aquifer II): In general the water quality of deep aquifer in North Solapur taluka is potable and very good for drinking, domestic, industrial as well as irrigation purposes. Nitrate more than 45 mg per litre was detected in water sample from Solapur and Gunjegaon. Fluoride more than 1.5 mg per litre was detected in water sample from Ranmasal, Hensal and Marde EWs. Very high salinity prevails (>2250 μ S/cm at Marde, which is not suitable for drinking, domestic, industrial as well as irrigation purposes. Ground water can be used for drinking only after treatment and for irrigation for very high salt tolerant crops and with proper soil and crop management practices.

Phreatic Aquifer (Aquifer-I)	Semiconfined/Confined Aquifer (Aquifer II)
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4. GROUND WATER ISSUES

Scanty rainfall
 Limited Aquifer Potential
 Water Scarcity - lean period
 Cropping of water intensive crops

5. GROUND WATER RESOURCE & EXTRACTION

5.1. Aquifer-I/ Phreatic Aquifer (Basalt)

Ground Water Recharge Worthy Area (Sq. Km.)	589.27
Total Annual Ground Water Recharge (MCM)	65.25
Natural Discharge (MCM)	3.26
Net Annual Ground Water Availability (Annual Extractable Ground Water Recharge) (MCM)	61.99
Current Annual Ground Water Extraction for irrigation (MCM)	39.91
Current Annual Ground Water Extraction for domestic and industrial water supply (MCM)	2.11
Current Annual Ground Water Extraction for All uses (MCM)	42.02
Provision for domestic and industrial requirement supply to 2025(MCM)	2.51
Net Ground Water Availability for future irrigation development (MCM)	19.69
Stage of Ground Water Extraction (%)	67.79
Category	SAFE

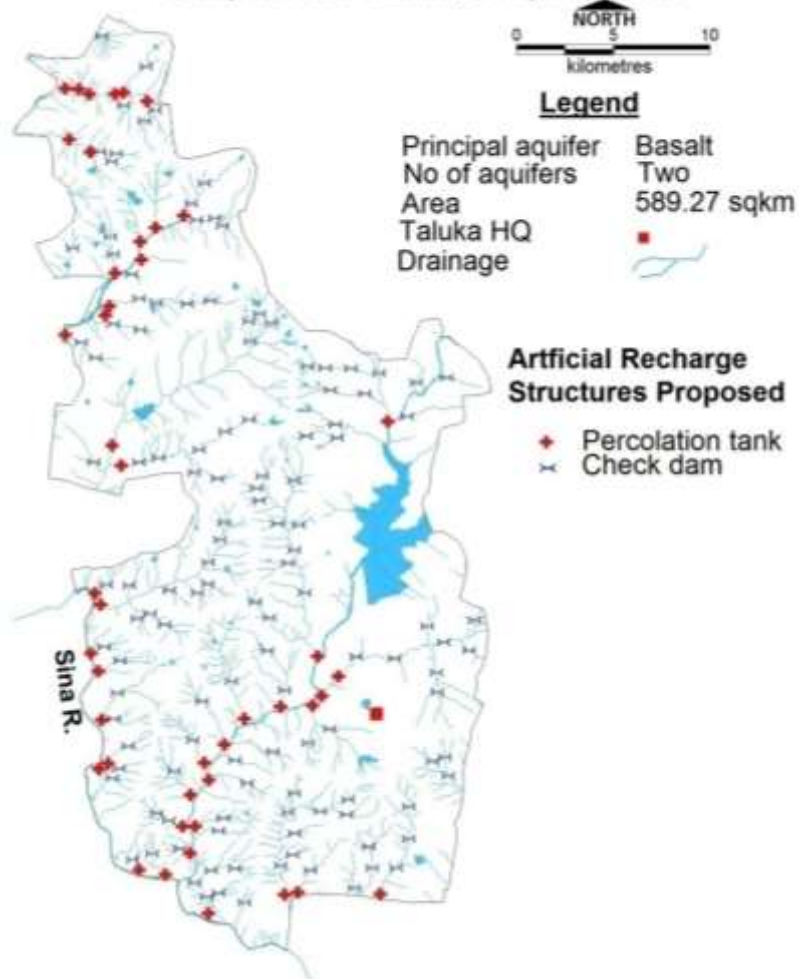
5.2 Aquifer-II - Semiconfined/Confined Aquifer (Basalt)

Area (sq.km)	Mean thickness (m)	Piezometric head (meter above bottom of confining layer)	Sy	S	Resource above confining layer (mcm)	Resource in confining aquifer (mcm)	Total Resource (mcm)
589.8985	1.25 to 9	55 to 90	0.0025	1.5E-05	6.49796	0.50868	7.0067

6.0. GROUND WATER RESOURCE ENHANCEMENT

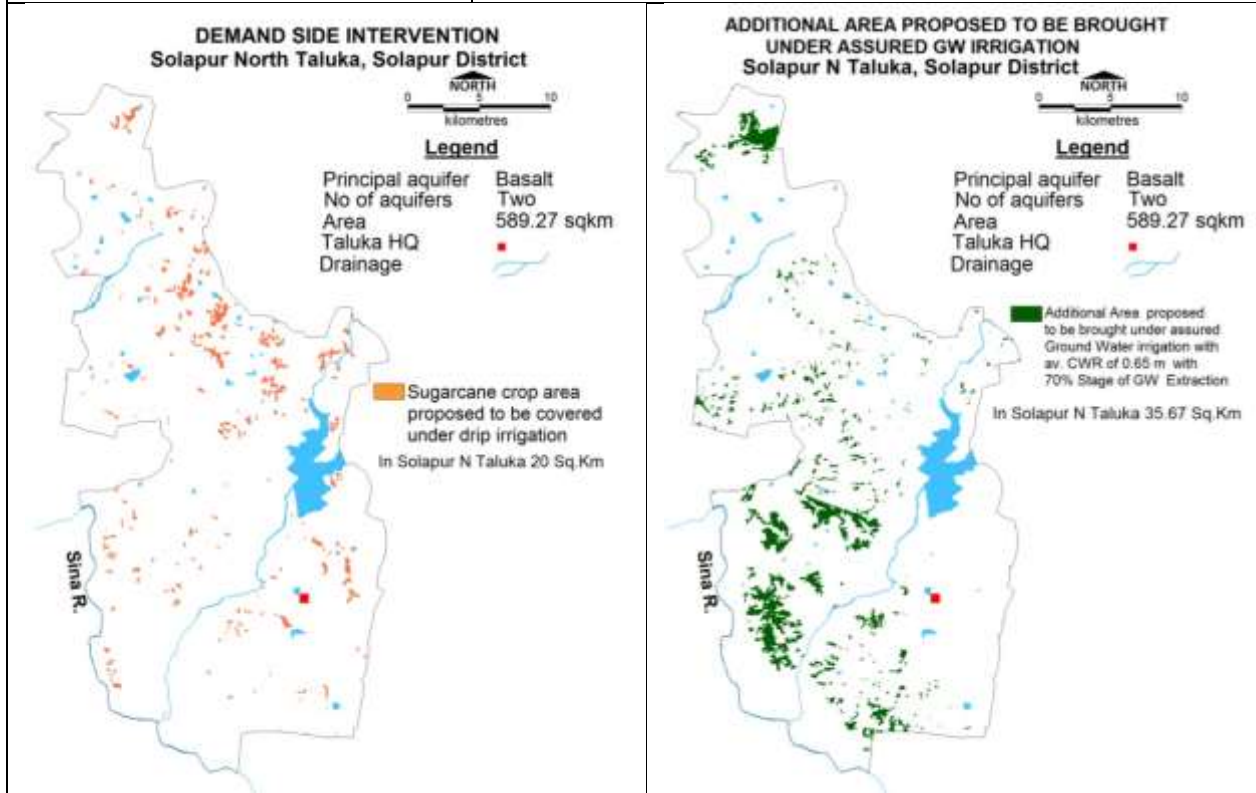
Stage of GW Development	67.79	
Annual Available Resource (MCM)	61.99	
Gross Annual Draft (MCM)	42.02	
6.1 SUPPLY (MCM)		
Agricultural Supply -GW	39.91	
Agricultural Supply -SW	56.85	
Domestic Supply - GW	2.11	
Domestic Supply - SW	0.5275	
Total supply (MCM)	99.4	
6.2. Supply Side Management - Rainwater Harvesting and Artificial Recharge		
Geographical Area (sq.km)	589.27	
Area feasible for recharge (sq. km.)	523.43	
Unsaturated Volume (MCM)	1046.86	
Surplus water available for AR (MCM)	12.82	
Proposed Structures	Percolation Tank (@ Rs.150 lakh, Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (@ Rs.30 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures	45	128
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	6.75	2.87
Total recharged @ 75 % efficiency (MCM)	9.62	
Current Annual Resource Availability (MCM)	61.99	
Current Annual Groundwater Extraction (MCM)	42.02	
Total GW resource available after supply side intervention (MCM)	71.61	
Stage of GWD after supply side interventions (%)	58.69	
Ground water available TO BRING STAGE OF GWD UPTO 70%	8.1	

**Artificial Recharge
Solapur North Taluka, Solapur District**



RTRWH - Urban Areas		
Households to be covered (10% with 50 m ² considering roof top area)	6471	
Total RWH potential (MCM)	0.18	
Rainwater harvested / recharged @ 80% runoff co-efficient	0.15	
Estimated Expenditure (Rs. in Cr.) @ Rs. 15000/- per HH	9.71	May be implemented if economically viable
Micro irrigation techniques - Area proposed to be covered under drip (sq.km)		
Sugarcane	20	
Onion	3	
Volume of Water expected to be saved with drip irrigation (MCM)		
Sugarcane	11.4	
Onion	0.78	
Total Volume of Water expected to be saved (MCM)	12.18	
Total GW Draft after Demand side intervention	29.84	
Stage of GWD after demand side interventions (%)	41.68	
GWR available/required to bring the	20.28	

STAGE OF GWD isto 70% (MCM)	
Additional Area (sq.km.) proposed to be brought under assured GW irrigation #2	31.2

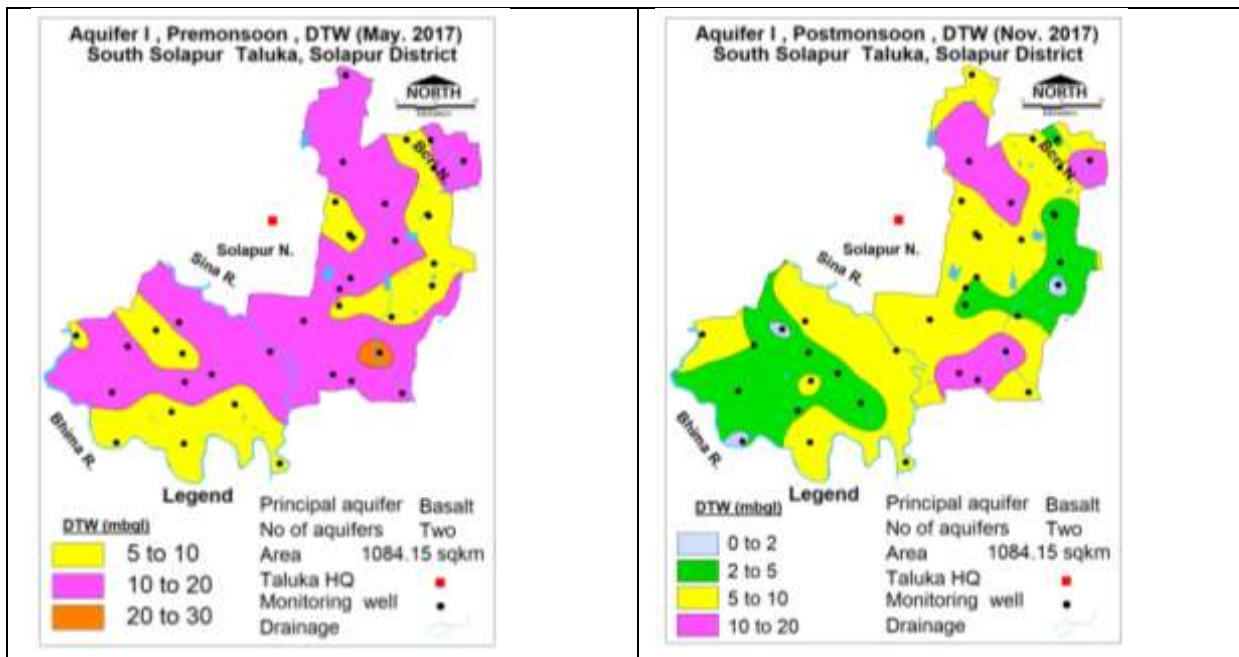


7.0. EXPECTED BENEFITS	
Annual Extractable Ground Water Recharge (MCM)	61.99
Current Annual Ground Water Extraction (MCM)	42.02
Water Recharged by Supply side intervention (MCM)	17.46
Water saving by demand side intervention (MCM)	19.95
Present Stage of Ground Water Extraction (%)	67.78
Ground water resources after supply side management (MCM)	79.45
Ground water Draft after demand side management (MCM)	29.84
Expected Stage of Ground Water Extraction after Supply and Demand side interventions (%)	41.68
8. DEVELOPMENT PLAN	
GW Resources Available for Development and Bring Stage of GWD upto 70% from present SOD	20.28
Proposed no. of DW (@ 1.5 ham for 90% of GWR Available)	1217
Proposed no. of BW* (@ 1.5 ham for 10% of GWR Available)	135
Additional Area (sq.km.) proposed to be brought under assured Ground Water irrigation with av. CWR of 0.65 m with 70% Stage of GW Extraction	31.2

9.11 SOUTH SOLAPUR TALUKA, SOLAPUR DISTRICT, MAHARASHTRA

1. SALIENT INFORMATION			
1.1. introduction			
Taluka Name	South Solapur		
Geographical Area (Sq. Km.)	1189.6		
Hilly Area (Sq. Km)	0.00		
Saline Area (Sq. Km.)	0.00		
Population (2011)	260897.00		
Climate	Tropical		
1.2 Rainfall Analysis			
Annual Rainfall (2017) (mm)	473.70		
Decadal Average Annual Rainfall (2007-17) (mm)	552.3 mm		
Normal Rainfall (mm)	599.2 mm		
Long Term Rainfall Analysis (1998-2017)	Falling Trend -15.49 mm/year Normal/Excess Rainfall- 45% & 55%. Drought (Moderate/Severe):-: 0 % Moderate & 2 % Severe.	Probability of Probability of	
Rainfall Trend Analysis (1901 To 2017) EQUATION OF TREND LINE: $y = -15.49x + 761.82$			
1.3. Geomorphology &Geology			
Geomorphonic Unit	Plateau Undissected to highly Dissected, with weathered thickness ranging from 0 to 1 m. Major parts of the taluka covered with Plateau Slightly Dissected (PLS), 0-1m weathering		
Soil	In general, they are clayey loam in texture and fairly high in calcium carbonate, high porosity but moderate to low permeability, thus having low to moderate infiltration capacity. Based on physical characteristics the soils of the area have been classified into three major groups: Medium black soil, Red Sandy soils and Shallow black soils		
Geology	Alluvium: sand/ silt and clay alternating beds Age: Recent to Sub-recent Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene		
1.4. Hydrology & Drainage			
Hydrology			

Bigger Minor Irrigation Project (>100 Ha.)	Completed: -3 MI Tanks
Minor Irrigation Project (<100 Ha.)	Completed: -801VT, 56 KT weirs & 43 DB
Drainage	The central part of taluka is drain by Sina rivers and its tributaries, flow from NW to SE direction and northern part drain by Bori river The taluka falls in Bhima subbasin.
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern	
Geographical Area (Sq. Km.)	1189.6
Forest Area (Sq. Km.)	18.27
Net Sown Area (Sq. Km.)	915.73
Double Cropped Area (Sq. Km.)	39.51
Gross Cropped Area (sq.km)	955.24
Cultivable Area (Sq. Km.)	1149.78
Area under Irrigation (Sq. Km.)	
Ground Water	111.58
Surface Water	4.42
Principal Crops	Area (Sq. Km.)(Reference year 2013-14)
Wheat	56.92
Jawar	677.37
Bajra	7.85
Maize	12.66
Tur	6.41
Sugarcane	35.72
Chilli	2.78
Mango	4.36
Onion	4.50
Sunflower	36.26
1.6. Water Level Behaviour	
1.6.1. Phreatic Aquifer-Water Level	
Pre-Monsoon (May-2017)- Water level in the range of 10 -20 mbgl has been observed in major part of the taluka, while water level less than 10 mbgl observed in northern and southern part of the taluka.	
Post-Monsoon (November-2017)- Water Level less than 5 mbgl has been observed in northeastern and southern parts of the Taluka while water level in the range of 5 to 10 mbgl is observed in major part of the Taluka; deeper water level more than 20 mbgl has been observed as isolated.	
Pre-Monsoon Water Level (May 2017)	Post-Monsoon Water Level (Nov. 2016)

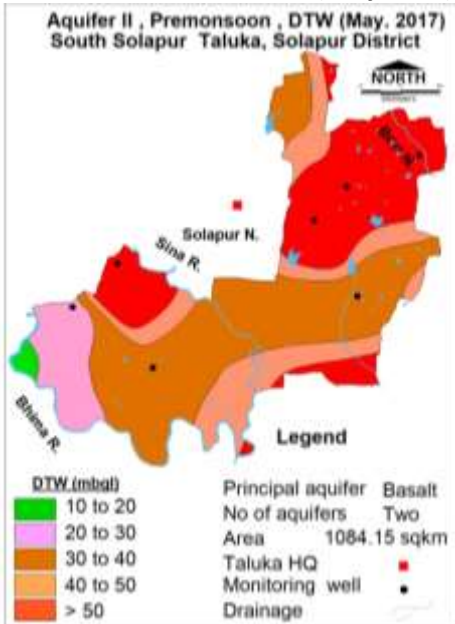


1.6.2. Semi-Confined/Confined Aquifer-Water Level

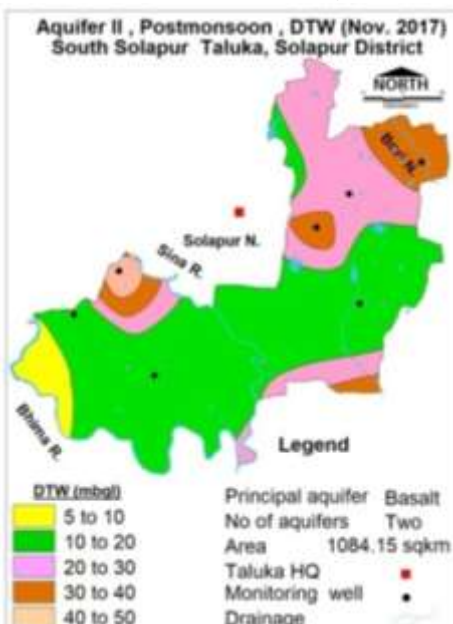
Pre-Monsoon (May-2017)- Water level > 20 mbgl is observed in south western part of the Taluka; deeper water level between 40 to >50 mbgl is observed in northern part of the Taluka .

Post-Monsoon (November-2017)- Water level <10 mbgl is observed in southwestern parts of the Taluka; 10 to 20 mbgl is observed in major part of the Taluka while >20 mbgl is observed in northern part of the Taluka.

Pre-Monsoon Water Level (May 2017)



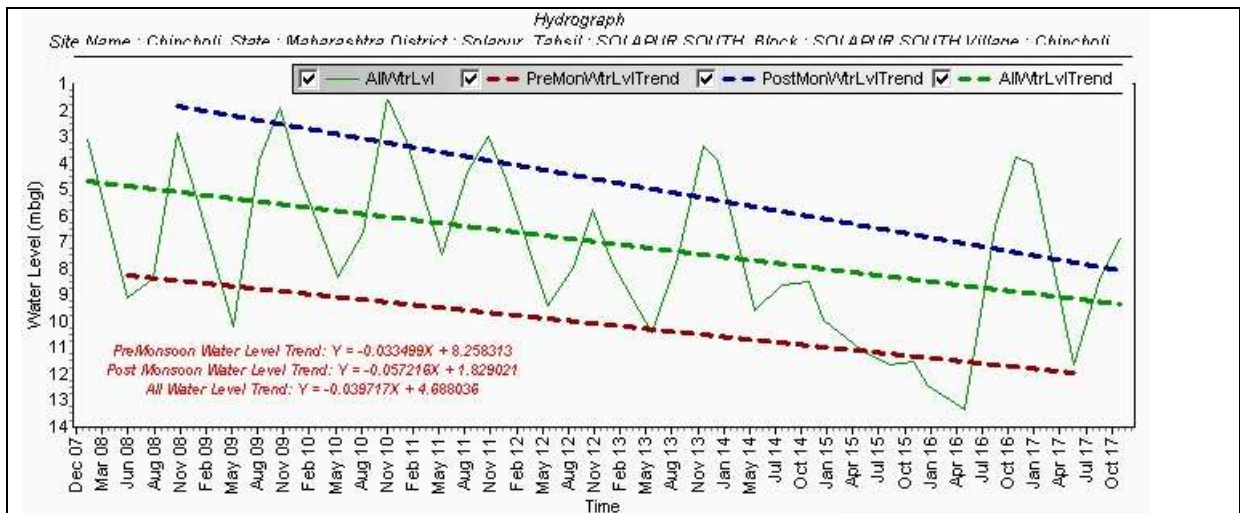
Post-Monsoon Water Level (Nov. 2017)



1.6.4. Hydrograph

Hydrograph shows Pre-monsoon rising trend @ 0.38 m/year

Hydrograph shows post-monsoon rising trend @ 0.135 m/year



1.6.3. Water Level Trend (2008-2017)

Pre-Monsoon trend	Rising 0.03 to 0.196 m/year
	Falling 0.004 to 0.176 m/year
	Declining trend up to 0.2 m/year is observed in about 50% area of Taluka; Rising water level trend has been observed in southern part and in isolated parts in northern part of the Taluka.
Post-Monsoon trend	Rising 0.07 to 0.15 m/year
	Falling 0.005 to 0.3 m/year
	Declining trend up to 0.2 m/year is observed in major part of Taluka; Rising water level trend has been observed in southern part and in isolated parts in northern part of the Taluka.

Premonsoon Water level Trend (2007-17)

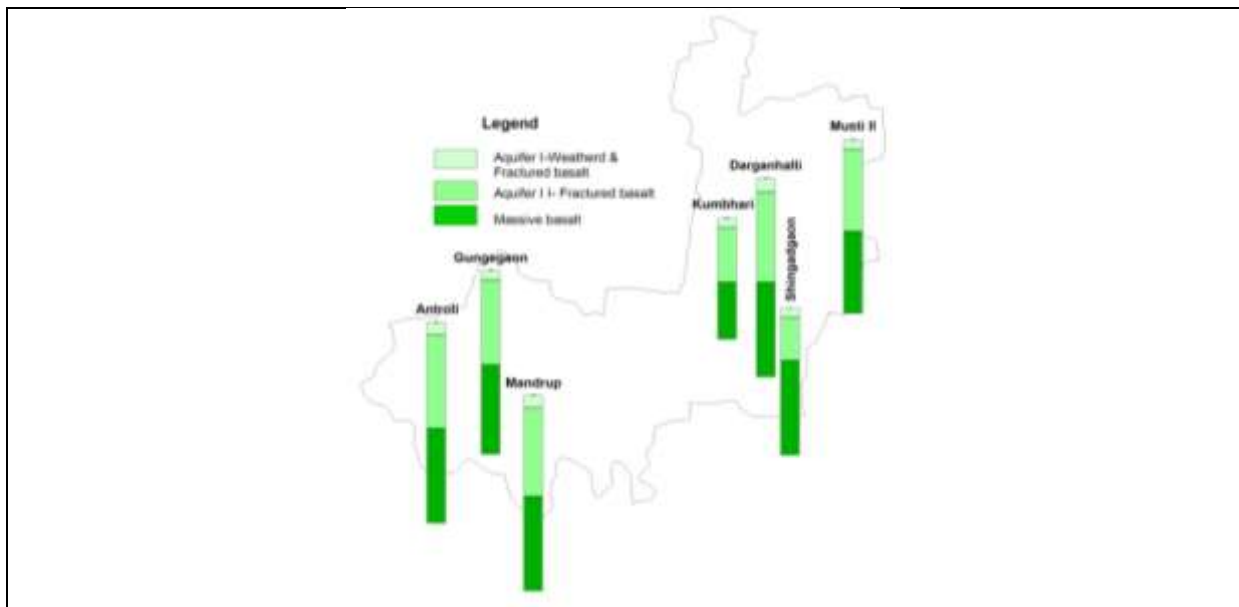


Postmonsoon Water level Trend (2007-17)

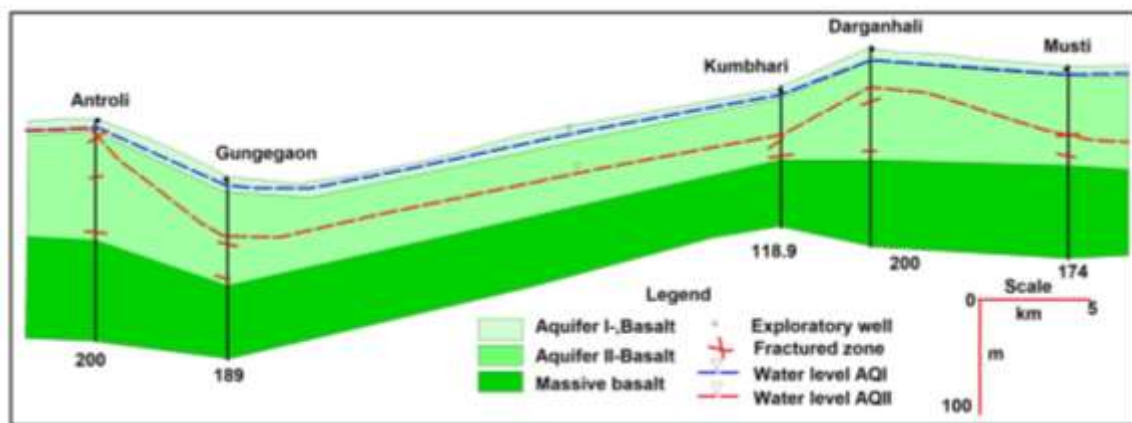


2. AQUIFER DISPOSITION

2.1. Number of Aquifers	Aquifer-I-Basalt	Aquifer-II-Basalt
2.2. Bar Diagram		



2.3. Cross Sections



2.4. Aquifer Characteristics

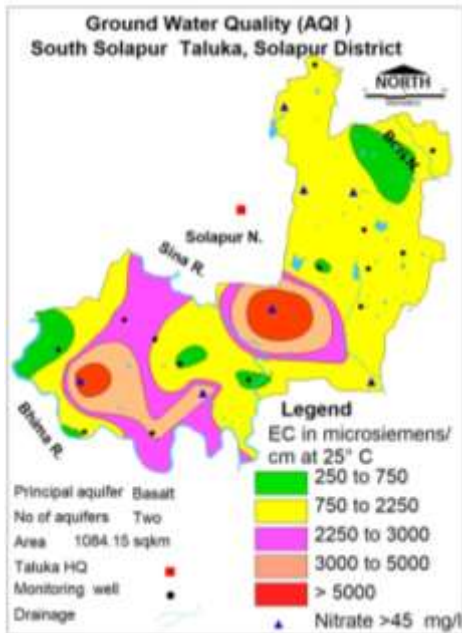
Major Aquifers	Basalt	Basalt
Type of Aquifer	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)
Depth of Occurrence (mbgl)	8 - 30	60 - 196
Thickness of weathered /fractured rocks (m)	5 - 15	1.25 - 11
Yield	10 - 100 m ³ /day	0.1 - 1.5 lps
Specific yield (Sy)	0.018- 0.02	0.0025
Storativity (S)		0.0000154
Transmissivity (T) (m ² /day)	T: 5-20 m ² /day	T: 30-70 m ² /day

3. GROUND WATER QUALITY

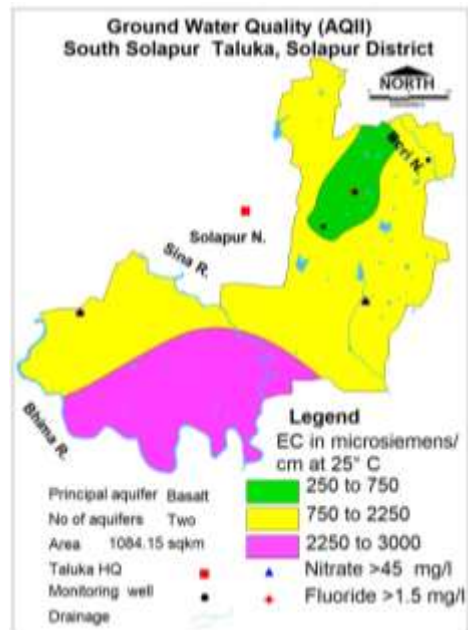
3.1 Phreatic Aquifer (Aquifer-I) : In general the water quality of shallow aquifer in Karmala taluka is potable and good for drinking, domestic, industrial as well as irrigation purposes. Nitrate more than 45 mg per litre was detected in water sample from Hatgi, Chincholi, Hatur, Kanbas, Telgaon Mulegaon,, Ule and Darganhalli very high salinity prevails (>2250 μ S/cm at Hatur and Telgaon), which is not suitable for drinking, domestic, industrial as well as irrigation purposes. Ground water can be used for drinking only after treatment and for irrigation for very high salt tolerant crops and with proper soil and crop management practices.

3.2: Semiconfined/Confined Aquifer (Aquifer II) : In general the water quality of deep aquifer in South Solapur taluka is potable and very good for drinking, domestic, industrial as well as irrigation purposes. Fluorid more than 1.5 mg per litre was detected in water sample from Manarup,Anthroli and Darganhalli EW.

Phreatic Aquifer (Aquifer-I)



Semiconfined/Confined Aquifer (Aquifer II)



4. GROUND WATER ISSUE

Low rainfall & Frequent drought
Declining Water level
Limited Aquifer Potential
Water Scarcity in Lean Season

5. GROUND WATER RESOURCE & EXTRACTION

5.1. Aquifer-I/ Phreatic Aquifer (Basalt)

Annual Extractable Ground Water Recharge (MCM)	110.70
Current Annual Ground Water Extraction for irrigation (MCM)	63.57
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	3.66
Current Annual Ground Water Extraction for All uses (MCM)	67.23
Annual GW Allocation for Domestic Use as on 2025 (MCM)	4.58
Net Ground Water Availability for future use	42.60
Stage of Ground Water Extraction (%)	60.73
Category	SAFE


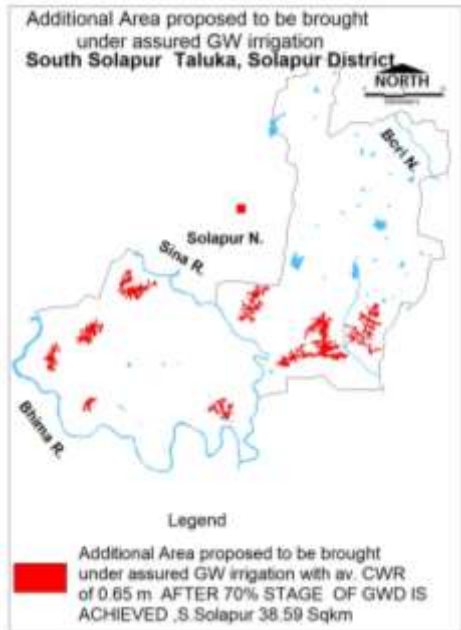
5.2 Aquifer-II - Semiconfined/Confined Aquifer (Basalt)

Area (sq.km)	Mean thickness (m)	Piezometric head (meter above bottom of confining layer)	Sy	S	Resource above confining layer (mcm)	Resource in confining aquifer (mcm)	Total Resource (mcm)
1196.226	3	48	0.005	1.45E-05	0.832573	17.94338	18.77596

6.0. GROUND WATER RESOURCE ENHANCEMENT

Stage of GW Development	60.73
Annual Available Resource (MCM)	110.7

Gross Annual Draft (MCM)	67.23	
6.1 SUPPLY (MCM)		
Agricultural Supply -GW	72.53	
Agricultural Supply -SW	-	
Domestic Supply - GW	3.66	
Domestic Supply - SW	0.91	
Total supply (MCM)	77.1	
6.2. Supply Side Management		
Geographical Area (sq.km)	1084.15	
Area feasible for recharge (sq. km.)	963.37	
Unsaturated Volume (MCM)	1926.73	
Surplus water available for AR (MCM)	14.7	
Proposed Structures	Percolation Tank (Av. Gross Capacity - 100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity- 10 TCM * 3 fillings = 30 TCM)
Number of Structures	51	147
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	7.69	3.34
Total recharged @ 75 % efficiency (MCM)	11.03	
Current Annual Resource Availability (MCM)	110.7	
Current Annual Groundwater Extraction (MCM)	67.23	
Total GW resource available after supply side intervention (MCM)	121.73	
Stage of GWD after supply side interventions (%)	55.23	
Ground water available TO BRING STAGE OF GWD UPTO 70%	17.98	
RTRWH Structures – Urban Areas		
Households to be covered (25% with 50 m2area)	12808.00	
Total RWH potential (MCM)	0.35	
Rainwater harvested / recharged @ 80% runoff co-efficient	0.28	May be implemented if economically viable
6.3. Demand Side Management		
Micro irrigation techniques - Area proposed to be covered under drip (sq.km)		
Sugarcane	3	
Onion	0	
Volume of Water expected to be saved with drip irrigation (MCM)		
Sugarcane	1.71	
Onion	0	
Total Volume of Water expected to be saved (MCM)	1.71	
Total GW Draft after Demand side intervention	65.52	
Stage of GWD after demand side interventions (%)	53.83	

GWR available/required to bring the stage of GWD isto 70% (MCM)	19.69
Additional Area (sq.km.) proposed to be brought under assured GW irrigation #2	30.29
Proposed Cropping Pattern change - Irrigated area under Water Intensive Crop(ha)	Not proposed
Water Saving by Change in Cropping Pattern	Nil
7.0. EXPECTED BENEFITS	
Annual Extractable Ground Water Recharge (MCM)	110.7
Current Annual Ground Water Extraction (MCM)	67.23
Water Recharged by Supply side intervention (MCM)	9.62
Water saving by demand side intervention (MCM)	12.18
Present Stage of Ground Water Extraction (%)	60.73
Ground water resources after supply side management (MCM)	120.32
Ground water Draft after demand side management (MCM)	65.52
Expected Stage of Ground Water Extraction after Supply and Demand side interventions (%)	53.83
8. DEVELOPMENT PLAN	
GW Resources Available for Development and Bring Stage of GWD upto 70% from present SOD	19.69
Proposed no. of DW (@ 1.5 ham for 90% of GWR Available)	1181
Proposed no. of BW* (@ 1.5 ham for 10% of GWR Available)	131
Additional Area (sq.km.) proposed to be brought under assured Ground Water irrigation with av. CWR of 0.65 m with 70% Stage of GW Extraction	30.29
Proposed AR Structures	Additional area proposed to be bought under assured GW irrigation
<p>Artificial Recharge Structure South Solapur Taluka, Solapur District</p>  <p>Legend</p> <p>Percolation tank + Check dam -</p> <p>Principal aquifer Basalt No of aquifers Two Area 1084.15 sqkm Taluka HQ Drainage</p>	 <p>Legend</p> <p>Additional Area proposed to be brought under assured GW irrigation with av. CWR of 0.65 m AFTER 70% STAGE OF GWD IS ACHIEVED .S.Solapur 38.59 Sqkm</p>

10. ANNEXURES

Annexures

Annexure-I (A): Taluka-wise Salient Features of Ground Water Exploration

Annexure-I (B): Salient Features of Ground Water Exploration and Water level Aquifer II.

Annexure-II: Water Level of GWM wells (2017) with long term trend (2008-2017)

Annexure-III: Details of GW monitoring wells and KOWs in Solapur district.

Annexure-IV: Chemical analysis of ground water samples, Shallow aquifers

Annexure-V: Chemical analysis of ground water samples, Deeper aquifers

Annexure-VI (A): Location (tentative) of proposed Artificial Recharge structures
(Percolation tanks)

Annexure-VI (B): Location (tentative) of proposed Artificial Recharge structures (Check
Dams)

Annexure-I (A): Salient Features of Ground Water Exploration

Sr. No.	Taluka	Formation	Wells			Depth (mbgl)	Pre SWL (mbgl)	Post WSL (mbgl)	Discharge (lps)	Drawdown (m)	Zones (mbgl)
			EW	OW	Pz						
1	Akkalkot	Basalt	4	0	0	200	13.9-100	8.00-56.00	meager to 3.00	_	19-172
2	Barshi	Basalt	8	1	0	85-200	12-100	2.0-35.0	meager to 4.4	25.78-86.71	1.8-189
3	Karmala	Basalt	8	0	0	133.2-200	9.0-36.7	5.3-11.25	meager to 5.94	42.95	9.0-191
4	Madha	Basalt	10	2	0	121.9-200	11-100	4.35-82.5	meager to 4.43	28.87-43.6	7.6-154
5	Malshiras	Basalt	12	2	0	150-200	9.0-73.0	3.5-45	Dry to 7.76	15-50	7.0-188
6	Mangalwedhe	Basalt	5	0	0	132.1-200	14-36.96	8.0-12.8	meager to 5.0	_	10.0-181.0
7	Mohol	Basalt	10	2	0	100-200	9.0-100.0	2.6-59	meager to 5.94	2.47	2.5-197.0
8	Pandharpur	Basalt	9	0	0	115-202	12.0-98.0	5.1-54.4	meager to 7.76	2.9->30	9.2-160
9	Sangola	Basalt	8	1	0	130-205.25	8.0-100	5.51-45.0	meager to 10	43.0-69.3	6.0-189.3
10	North Solapur	Basalt	5	1	1	40.0-205.25	12.0-100.0	6.56-46.0	meager to 10.8	24.3-24.86	7.0-207.4
11	South Solapur	Basalt	9	0	0	40-200	26-100	11-59.35	meager to 4	43.39	8.6-200
Total			88	9	1	40-205.25	8.0-100.0	2.0-82.5	meager to 10.8	2.47-86.71	1.8-207.4

Annexure-I (B): Salient Features of Ground Water Exploration and Water level Aquifer II.

Sl. No	Village	Type of Well	Taluka	Lat_Dec	Long_Dec	Depth Drilled (mbgl)	Depth of casing (mbgl)	Aquifer zones Encountered (mbgl)	Aquifer	Pre SWL (mbgl)	Post SWL (mbgl)	Discharge (lps)	DD(m)
1	Mahalung EW	EW	Malshiras	75.094	17.856	200	5.5	85-86	MFB	73	45	0.38 lps	-
2	Malkhambi	EW	Malshiras	75.122	17.815	156	11.5	45-47,85-86,153-155	MFB	27.4	21	3.17 lps	26.63
3	Malkhambi	OW	Malshiras	75.122	17.815	150	13.5	37-39,48-50,88-90	MFB	32	20.05	3.17 lps	27.54
4	Maloli EW	EW	Malshiras	75.039	17.728	200	5.5	80-83	MFB	60	27	meager	
5	Akluj EW	EW	Malshiras	75.028	17.895	188	5.5	62-65,117.4-120.4,166-169,186-188	MFB	21	14.6	3.17 lps	37.1
6	Akluj OW	OW	Malshiras	75.028	17.894	200	5.5	38-40,66-68,120-122,166-1169	MFB	27.35	12	2.64 lps	-
7	Vizori EW	EW	Malshiras	74.992	17.812	200	26.5	71.6-74.7,89.90-93.3	MFB	50	21	0.38 lps	>50
8	Tamshidwadi	EW	Malshiras	74.822	17.889	200	29.5	93-94	MFB	17	3.5	7.76 lps	15
9	Tungat-EW	EW	Pandarpur	75.434	17.744	200	11.5	32-35,178-181	VB	98	38	Meager	
10	Pimpari-EW	EW	Malshiras	74.692	17.886	200	11.5	35-38,178-181	MFB	21	9.15	<0.14	
11	Phondshiras-	EW	Malshiras	74.811	17.932	200	29.5		Dry	76	31	Dry	
12	Pokharapur-	EW	Mohol	75.587	17.797	200	23.5	68-71	MFB	50.2	31	2.16	
13	Puluj-EW	EW	Pandarpur	75.533	17.663	200	32.5	27-30,50-52	VFVB	25	5.1	3.77	27
14	Akkalkot	EW	Akkalkot	76.208	17.521	200	5.8	166 -172	F VB	100	43	0.78	-
15	Barhanpur	EW	Akkalkot	76.179	17.638	200	5.8	27 -31 ,105 -114	F VB & F MB	38.3	18	0.78	-
16	Nagansur	EW	Akkalkot	76.162	17.385	200	5.8	36 -38 ,138 -151	VB	100	56		-
17	Wagdari	EW	Akkalkot	76.358	17.613	200	5.8	19 -23 ,126 -135	VB	13.9	8	3	-
18	Chaara	EW	Barshi	75.803	18.371	153.75	3	1.8 -3 ,31.5 -43	Basalt	15	2	0.55	86.71
19	Gaudgaon	EW	Barshi	75.971	18.067	117.2	5.8	70 -84	F AB	69.28	23	-	-
20	Kale Shelgaon	EW	Barshi	75.683	18.288	194.1	5.3	4 -5.3 ,20.3 -25.5 ,103 -109.7 ,86 -89 ,145 -171.5 ,182 -189	Basalt	12	4.11	1.48	-
21	Kalegaon	EW	Barshi	75.758	18.096	141.6	5.8	18 -22 ,135 -141	F VB	100	35	4.4	-

22	Mahagaon	EW	Barshi	75.800	18.188	200	5.8	90 -96	F VB	63.8	21	-	-
23	Nandini	EW	Barshi	75.843	18.110	161.5	10.6	10.8 -11.2 ,150 -153	Basalt	19	8.87	0.81	58.59
24	Shelgaon (O)	OW	Barshi	75.817	17.950	85	2	-6 ,17 -24 ,68 -77 ,40 -49	J MB	19	10.99	-	-
25	Shelgone (E)	EW	Barshi	75.817	17.950	175.8	1.7	69.08 -85.13 ,102.6 -152.4	J MB	21	14.22	1.25	25.78
26	Wanewadi	EW	Barshi	75.609	18.154	175	2	6 -11.5 ,41.5 -61	FB	12	9.71	-	-
27	Torewadi	EW	Beed	75.760	18.235	180.9	2	2 -4 ,37 -42	Basalt	8	1.92	1.86	48.8
28	Mundewadi	EW	Kalamb	75.543	17.505	178	19.5	5 -33.5 ,160 -170	FB	15	7.7	3	25.75
29	Anakdhal	EW	Karmala	75.079	17.368	149.4	-		FB	17	9	3	42.95
30	Hirse	EW	Karmala	75.296	18.346	200	5.8	9 -26 ,106 -114	F VB	12	4.48	5.94	-
31	Hiwarewadi	EW	Karmala	75.180	18.423	133.2	-	19 -32	Basalt	17	6	-	-
32	Nerla	EW	Karmala	75.358	18.258	200	5.8	30 -41	F MV/F VB	12	6.3	-	-
33	Rajuri	EW	Karmala	75.017	18.329	200	5.8	10--25	F VB	9	6.1	1.37	-
34	Vadshivane	EW	Karmala	75.229	18.171	200	5.8	59 -65 ,105 -111	F VB	36.7	11	0.78	-
35	Zare	EW	Karmala	75.141	18.324	200	5.8	47027	F VB	21	11.25	-	-
36	Nagaj	EW	Kavathe Mahankal	75.142	18.017	177	-	8 -12 ,48 -58 ,98 -101 ,78 -82 ,118 -120 ,140 -152	W Basalt	12	8	1.69	1.1
37	Anjangaon	EW	Madha	75.547	17.936	200	11.7	80.35 - ,145 -154	F AB	100	45	-	-
38	Betergaon Haveli	EW	Madha	75.390	18.210	180.4	3.75	8 -32.5 ,146.5 -154	Basalt	32	14	-	-
39	Madha	EW	Madha	75.521	18.033	200	5.8	60 -83 ,145 -153	F VB	60.59	21	-	-
40	Parite	EW	Madha	75.283	17.942	200	5.8	13.5 -16 ,124 -130	F VB	98	37	1.37	-
41	Temburni	EW	Madha	75.192	18.025	200	5.8	10 -13 ,65 -75	F VB	24	10.45	4.43	-
42	Temburni	OW	Madha	75.192	18.025	200	5.8	41548	F VB	15	9.1	-	-
43	Vairag	EW	Madha	75.804	18.052	200	5.8	89 -92	F VB	100	45	-	-
44	Wadsinghe	EW	Madha	75.516	18.090	121.9	1.7	8.4 -28 ,33.5 -54	Basalt	11	8.33	3	28.87
45	Malshiras	EW	Malshiras	74.908	17.858	200	5.8	41548	F VB	9	5.44	2.16	-
46	Natepute	EW	Malshiras	74.750	17.900	200	5.8	7 -13 ,38 -58	F VB	9	5	2.16	-
47	Velapur	EW	Malshiras	75.064	17.787	200	5.8	26 -44	F VB	12	6	1.37	-

48	Bhose	EW	Mangalvedhe	75.375	17.308	200	5.8	16 -20	F VB	19	12.8	-	-
49	Malawadi	EW	Mangalvedhe	75.415	17.554	132.1	3.5	10 -21 ,13.79 -19.35,32 -35 ,72 -76 ,42 -55 ,92 -105 ,115 -116	W Basalt	21	11.2	5	-
50	Marwade	EW	Mangalvedhe	75.515	17.439	200	5.8	38 -44 ,160 -166	F VB	36.96	12	1.37	-
51	Nandeswar	EW	Mangalvedhe	75.378	17.369	200	5.8	59 -65 ,163 -181	F VB/MB	14	9	3.77	-
52	Nandur	EW	Mangalvedhe	75.592	17.442	200	11.7	83 -105	VB	17	8	3	-
53	Ankoli	EW	Mohol	75.613	17.671	200	5.5	181 -190	VB	45	21	3.1	-
54	Hivre	EW	Mohol	75.530	17.858	200	5.8	114 -123	F AB	22	15.9	0.78	-
55	Khanvi (E)	EW	Mohol	75.567	17.783	164.6	2	87.4 -123.25	VB	9	2.68	-	-
56	Mohol	EW	Mohol	75.633	17.818	200	5.8	37 -41 ,190 -197	F AB	21	13.9	1.05	-
57	Narkhed	EW	Mohol	75.653	17.894	200	5.8	141 -157	F AB	100	46	3.17	-
58	Narkhed	OW	Mohol	75.653	17.894	200	5.8	47 -70	F AB	100	42	0.78	-
59	Paremeshwar Pimpri	EW	Mohol	75.696	17.667	128	3.5	2.5 -4.8 ,12.7 -28	Basalt	12	2.65	4	2.47
60	Shetphal	EW	Mohol	75.429	17.900	200	5.8	62 -65	F VB	94.78	38	-	-
61	Solapur	EW	Mohol	75.754	17.663	200	5.8	13 -20 ,157 -169	F VB	12	2.6	-	-
62	Bhalvani	EW	Pandharpur	75.125	17.672	200	5.8	25.7 -37	F VB	33.91	16	-	-
63	Kardi	EW	Pandharpur	75.269	17.577	202	17	127 -137	Basalt	14	7.1	3	2.9
64	Kasegaon	EW	Pandharpur	75.325	17.617	200	5.8	34 -44 ,68 -77	F VB	72	32	1.37	-
65	Mangewadi	EW	Pandharpur	75.105	17.409	173	5.5	9.2 -35.5 ,151.6 -153.5	Basalt	12	6.41	2.3	5.87
66	Pandarpur	EW	Pandharpur	75.316	17.683	115	5.8	15 -22.6 ,40 -47	F VB	18	14.6	7.76	-
67	Kurudu	EW	Paranda	75.392	18.080	200	5.8	85.7 -90 ,147 -150	F VB	77.79	25	1.37	-
68	Anakdhal	EW	Sangola	75.079	17.369	195	-		Basalt	15	11.6	5	69.3
69	Anakdhal	OW	Sangola	75.079	17.369	175	-	9 -15 ,65 -67		14	9.71	-	-
70	Chandalwadi	EW	Sangola	74.917	17.889	199.25	5.55	6 -47.8 ,56 -75.6 ,146.4 - 179.3 ,92 -137.5 ,184.3 - 189.3	Basalt	10	5.96	-	43
71	Ekhatpur	EW	Sangola	75.148	17.480	199.25	6	7 -7.72 ,81.5 -91.5	Basalt	9	5.51	4	-

72	Kadlar	EW	Sangola	75.193	17.365	205.25	60.3	20 -55 ,96.7 -115 ,155.5 -166 ,117.5 -132.5	Basalt	8	6.25	10	-
73	Kamlapur	EW	Sangola	75.119	17.418	200	5.8	65 -68 ,153 -156	F VB	100	45	-	-
74	Mohud Budruk	EW	Sangola	75.125	17.596	200	5.8	35 -38	F VB	35	17	-	-
75	Sangole	EW	Sangola	75.200	17.450	130	1	6.4 -9.4 ,31 -35 ,55.4 -74 ,42.5 -46.4 ,81 -82 ,115 -116	Basalt	31	21	-	60
76	Wasud	EW	Sangola	75.167	17.396	176.5	4.25	56 -60 ,107 -109	Basalt	25	13.58	2.5	-
77	Gungegaon	EW	Solapur North	75.754	17.600	189	5.11	7 -10 ,168 -181	F VB	100	46	5.9	-
78	Hensal	EW	Solapur North	75.947	17.825	180.15	16.35	10 -14.4 ,10 -14 ,112 -116 ,50.8 -58.8 ,148 -177.8	Basalt	32	22.1	10.8	-
79	Marde	EW	Solapur North	75.895	17.800	205.25	3.85	64 -68.3 ,74 -83 ,161 -166 ,145 -146.3 ,194.8 -197 ,203 -207.4	Basalt	22	10.55	13.75	24.86
80	Ranmasal	EW	Solapur North	75.808	17.864	136.55	2	27.5 -35 ,65 -85	Basalt	12	6.56	2	24.3
81	Solapur	EW	Solapur North	75.921	17.675	171.1	5.8	16 -23 ,77 -117	F VB	39.9	14.88		-
82	Solapur	OW	Solapur North	75.921	17.675	200	5.8	16 -26 ,92 -99	F VB	37.02	16	3.17	-
83	Solapur IMD	Pz	Solapur North	75.900	17.670	40	5.6	12.00-13.00	WFB	25	12	0.04	
84	Antroli	EW	Solapur South	75.700	17.550	200	5.5	26 -35 ,180 -197	VB	26	12		-
85	Darganhalli	EW	Solapur South	76.029	17.688	200	5.5	56 -62 ,190 -200	VB	55.86	21		-
86	Kumbhari	EW	Solapur South	75.991	17.649	118.9	2.4	8.6 -19.3 ,39 -47 ,83 -115 ,67.2 -83	Basalt	100	37	4	43.39
87	Mandrup	EW	Solapur South	75.797	17.480	200	5.5	23 -26 ,182 -187	VB	36.2	12		-
88	Musti I	EW	Solapur South	76.117	17.725	40	-		VB	92.48	35		-
89	Musti II	EW	Solapur South	76.116	17.724	174	18.3	92 -99 ,169 -174	VB	100	35		-
90	Shingadgaon	EW	Solapur South	76.042	17.563	200	-			32	11	-	-
91	Palshi	EW	Malshiras	74.682	17.919	153.4	-	145 -150	Basalt	21	11		

Annexure-II: Water Level of Ground water monitoring wells (2017) with long term trend (2008-2017)

SN	Taluka	Village	Y	X	Pre DTW (mbgl)	Post DTW (mbgl)	Fluctuation (m)	Premonsoon WL trend (m/year)		Postmonsoon WL trend (m/year)	
								Rise	Fall	Rise	Fall
1	AKKALKOT	Arali	17.674	76.159	10	6.4	3.6	0.00398			0.29335
2	AKKALKOT	Basalegaon	17.449	76.288	8	2.9	5.1	0.04806			0.3443
3	AKKALKOT	Binjger	17.4	76.325	10.5	5.3	5.2	0.01341		0.12452	
4	AKKALKOT	Borgaon	17.65	76.313	5.65	6.1	-0.45		0.12244	0.002	
5	AKKALKOT	Chapalgaon	17.608	76.175	9.1	6.7	2.4		0.16943	0.04786	
6	AKKALKOT	Chikkahalli	17.6	76.179	10.1	3.1	7	0.21843			0.1846
7	AKKALKOT	Chungi	17.661	76.229	8	6.9	1.1		0.11264	0.00837	
8	AKKALKOT	Dudhani (Rural))	17.588	76.268	9.2	8.6	0.6		0.19874	0.02063	
9	AKKALKOT	Gogaon	17.623	76.4	7.3	3.4	3.9		0.10181		0.04496
10	AKKALKOT	Hannur	17.424	76.271	6.6	3.1	3.5		0.13424	0.05023	
11	AKKALKOT	Jeur	17.479	76.108	10.6	6.7	3.9		0.09079		0.1393
12	AKKALKOT	Kajikanbas	17.713	76.283	9.6	3	6.6	0.04081		0.00932	
13	AKKALKOT	Karjal	17.564	76.117	12.8	3	9.8	0.03157		0.03815	
14	AKKALKOT	Kini	17.683	76.265	11.4	6.1	5.3	0.06859			0.26981
15	AKKALKOT	Kurnur	17.631	76.217	7.4	1	6.4		0.05909	0.01263	
16	AKKALKOT	Satan Dudhani	17.426	76.268	9.3	4	5.3		0.0556	0.01325	
17	AKKALKOT	Sultanpur	17.694	76.231	7.5	2.5	5	0.05006			0.30084
18	AKKALKOT	Udagi	17.433	76.225	8.1	3.7	4.4		0.02527	0.00244	
19	AKKALKOT	Wagdari	17.6	76.358	9.2	2.5	6.7	0.00463		0.06271	
20	BARSHI	Agalgaon	18.317	75.746	8.9	3.1	5.8	0.02521			0.06321
21	BARSHI	Alipur	18.215	75.662	7.9	3.5	4.4	0.11288		0.04718	
22	BARSHI	Chare	18.349	75.807	4.2	2.2	2		0.14819	0.05063	
23	BARSHI	Chikharde	18.208	75.832	8.9	2.3	6.6	0.05945		0.00067	
24	BARSHI	Gaudgaon	18.063	75.972	8.6	2.25	6.35	0.00704		0.02331	
25	BARSHI	Jamgaon	18.157	75.863	7.7	2	5.7	0.00391		0.0481	

26	BARSHI	Kalambawadi (A)	18.375	75.754	7.5	3.8	3.7		0.01937	0.03061	
27	BARSHI	Kari	18.24	75.913	8	0.2	7.8		0.12028		0.15797
28	BARSHI	Kuslamb	18.281	75.774	5.8	0.5	5.3		0.10728	0.00585	
29	BARSHI	Malwandi	18.058	75.658	7.6	2	5.6	0.06331			0.11492
30	BARSHI	Nandani	18.108	75.836	8	3	5	0.03045		0.00493	
31	BARSHI	Pangaon	18.138	75.737	8	3.05	4.95	0.02046		0.00426	
32	BARSHI	Raleras	18.006	75.814	7	2.4	4.6	0.02641			0.07717
33	BARSHI	Shendri	18.176	75.558	10.9	6	4.9	0.4648		0.03899	
34	BARSHI	Vairag	18.056	75.804	8.4	3.8	4.6	0.17605		0.04783	
35	KARMALA	Alsunde	18.283	75.313	7.55	3.1	4.45	0.255		0.21	
36	KARMALA	Arjunnagar	18.329	75.283	7.8	3	4.8	0.04446		0.00562	
37	KARMALA	Bhalavni	18.207	75.2	8.1	2	6.1	0.36389		0.07833	
38	KARMALA	Bhilarwadi	18.342	74.896	18	4.5	13.5	0.04887		0.00123	
39	KARMALA	Bhose	18.429	75.171	12	0.8	11.2	0.09687		0.32914	
40	KARMALA	Borgaon	18.426	75.263	12.75	7.9	4.85	0.02116		0.07246	
41	KARMALA	Deolali	18.372	75.186	6.5	0.1	6.4	0.02		0.1	
42	KARMALA	Ghargaon	18.479	75.293	7.35	0.9	6.45	0.01959			0.03483
43	KARMALA	Jategaon	18.506	75.185	13.5	2.9	10.6		0.17299	0.00927	
44	KARMALA	Jinti	18.354	74.886	7.8	3	4.8	0.02663		0.04444	
45	KARMALA	Karmala	18.4	75.197	8.5	2	6.5		0.1203	0.04897	
46	KARMALA	Kavitgaon	18.154	75.2	5.2	0.5	4.7		0.16993	0.02069	
47	KARMALA	Kedagaon	18.274	75.079	8.8	4	4.8	0.02083		0.02474	
48	KARMALA	Kem	18.171	75.293	9.35	2.6	6.75	0.1692		0.02601	
49	KARMALA	Ketur	18.288	74.954	8	0.7	7.3	0.06439		0.07673	
50	KARMALA	Khadaki	18.533	75.228	13.61	2.1	11.51	0.01862		0.09589	
51	KARMALA	Mangi	18.458	75.189	7.9	3.5	4.4	0.00987		0.08957	
52	KARMALA	Padali	18.479	75.293	14.3	5	9.3	0.14467		0.06826	
53	KARMALA	Pande	18.378	75.233	10.5	10.5	0	0.14066		0.39843	
54	KARMALA	Pophalaj	18.293	75.117	10.8	1.6	9.2	0.39076		0.18663	

55	KARMALA	Rajuri	18.335	75.002	8.1	2.8	5.3	0.04601		0.05089	
56	KARMALA	Sarapdoh	18.313	75.214	8.1	2.4	5.7		0.14946	0.04328	
57	KARMALA	Savadi	18.38	74.986	8.7	3.3	5.4	0.15018		0.12803	
58	KARMALA	Shelgaon (Wangi)	18.344	75.247	7	2.7	4.3	0.06389		0.07837	
59	KARMALA	Veet	18.378	75.117	7.5	3.6	3.9	0.25		0.13372	
60	KARMALA	Warkute	18.25	75.333	7.7	3.1	4.6	0.01413		0.01933	
61	MADHA	Adhegaon	18.036	75.117	6.5	0.7	5.8		0.1337	0.06211	
62	MADHA	Ambad	18.071	75.347	9.65	5	4.65		0.02228	0.01301	
63	MADHA	Aran	17.908	75.325	17.5	6	11.5	0.55129		0.11412	
64	MADHA	Barloni	18.146	75.415	7.65	5	2.65	0.00878		0.0165	
65	MADHA	Bavi	17.938	75.428	12.8	3.1	9.7	0.23		0.01	
66	MADHA	Bhend	18.007	75.374	10.7	2.8	7.9	0.23859		0.07744	
67	MADHA	Dhanore	18.003	75.688	9	3	6	0.1279		0.03932	
68	MADHA	Kanhergaon	18.073	75.226	6.3	3.5	2.8		0.12591	0.05509	
69	MADHA	Kewad	18.028	75.588	12	6.1	5.9		0.07935	0.038	
70	MADHA	Loni	18.246	75.396	6.7	0.2	6.5	0.0337		0.00173	
71	MADHA	Madha	18.033	75.517	17.25	4.8	12.45	0.1087		0.38387	
72	MADHA	Manegaon	17.989	75.652	15	2.6	12.4	0.125		0.06715	
73	MADHA	Modnimb	17.908	75.4	21	12.2	8.8	0.24402		0.14702	
74	MADHA	Palwan	18	75.3	10	5	5	0.09511		0.00211	
75	MADHA	Parite	17.979	75.243	12.2	4.5	7.7	0.11861		0.02568	
76	MADHA	Tembhurni	18.026	75.192	6.5	3.6	2.9		0.10791	0.02901	
77	MADHA	Tulshi	17.908	75.325	12.3	6	6.3		0.01582	0.17541	
78	MADHA	Upalai Bk	17.967	75.492	12.3	4.5	7.8		0.1444	0.03222	
79	MADHA	Warawade	17.967	75.308	8.4	2.4	6	0.0112			0.19743
80	Malshiras	Bacheri	17.649	74.968	9	3.2	5.8	0.06775			0.10329
81	Malshiras	Dharpuri	17.939	74.675	7	5.25	1.75		0.12376	0.41871	
82	Malshiras	Foundshiras	17.932	74.813	8.6	5.6	3	0.03893		0.06198	
83	Malshiras	Gursale	17.878	74.668	4.7	4.2	0.5		0.12675		0.11143

84	Malshiras	Jalbhavi	17.754	74.847	7.7	5	2.7		0.01193	0.02784	
85	Malshiras	Karunde	17.908	74.761	10.8	4.7	6.1	0.10601			0.18623
86	Malshiras	Khudus	17.825	74.842	6	2.5	3.5	0.00754			0.07904
87	Malshiras	Kothale	17.871	74.639	10.1	5.9	4.2	0.00095		0.17286	
88	Malshiras	Kurbavi	18.022	74.721	7	6.5	0.5	0.08491		0.42012	
89	Malshiras	Lawang	17.883	75.126	10.8	3.35	7.45	0.12786			0.07665
90	Malshiras	Malkhambi	17.751	75.119	9.1	6	3.1	0.14		0.17545	
91	Malshiras	Malshiras	17.864	74.911	9	2.7	6.3	0.10592		0.0509	
92	Malshiras	Natepute	17.897	74.756	6	3.9	2.1	0.0566			0.00958
93	Malshiras	Piliv	17.683	74.967	9	8	1	0.06574		0.25872	
94	Malshiras	Tandulwadi	17.758	76.088	10	4.3	5.7		0.19657		0.15997
95	Malshiras	Tarangfal	17.778	74.925	6.4	4.5	1.9	0.0087		0.04571	
96	MANGALVEDHE	Barmhapuri	17.56	75.556	8	3.1	4.9	0.04823			0.16461
97	MANGALVEDHE	Borale	17.494	75.585	13	4	9		0.00777	0.02616	
98	MANGALVEDHE	Diksal	17.407	75.528	8	2.7	5.3	0.25361		0.09104	
99	MANGALVEDHE	Jalihai	17.392	75.385	5.5	1.4	4.1	0.1		0.08	
100	MANGALVEDHE	Kagasht	17.402	75.55	9	6.5	2.5	0.01265		0.07524	
101	MANGALVEDHE	Pout	17.342	75.529	8	4	4		0.05456	0.05617	
102	MANGALVEDHE	Siddhankeri	17.367	75.419	8.35	3.5	4.85		0.00074	0.05841	
103	MOHOL	Adhegaon	17.735	75.558	8.4	3.2	5.2		0.0162	0.06848	
104	MOHOL	Arjunsond	17.751	75.724	7	2.3	4.7		0.20582	0.08071	
105	MOHOL	Bairagwadi	17.979	75.7	11.8	3.6	8.2		0.05	0.1	
106	MOHOL	Bhoire	17.872	75.675	4.9	1.4	3.5	0.16222		0.00961	
107	MOHOL	Deodi	17.882	75.508	14.2	4	10.2		0.15		0.1
108	MOHOL	Galandwadi	17.896	75.576	9.2	2.89	6.31		0.1	0.05	
109	MOHOL	Hivare	17.843	75.538	15.7	1.2	14.5	0.67241		0.11312	
110	MOHOL	Ichgaon	17.601	75.604	6.9	2.5	4.4	0.06481		0.03222	
111	MOHOL	Kamthi Kh	17.64	75.71	12.1	2.9	9.2	0.16326		0.11132	
112	MOHOL	Kurul	17.676	75.661	6.1	4	2.1	0.05866		0.14129	

113	MOHOL	Malikpeth	17.874	75.643	6.1	0.8	5.3	0.35		0.078	
114	MOHOL	Maslechaudhari	17.915	75.731	12	7.5	4.5	0.1		0.20081	
115	MOHOL	Narkhed	17.904	75.678	7.5	3.2	4.3	0.01535		0.03457	
116	MOHOL	Papri	17.825	75.475	15	4.7	10.3	0.275		0.08	
117	MOHOL	Patkul	17.749	75.529	7.8	2.3	5.5		0.03807	0.01474	
118	MOHOL	Pokharapur	17.8	75.596	11.2	3.5	7.7	0.04405		0.03392	
119	MOHOL	Telangwadi	17.883	75.457	18.2	4.3	13.9		0.1	0.05	
120	MOHOL	Wagholi	17.624	75.664	6.2	2.1	4.1		0.10256	0.05522	
121	MOHOL	Warkute	17.689	75.596	9.2	3.5	5.7		0.10573	0.26887	
122	MOHOL	Yawali	17.84	75.596	13.6	8.9	4.7	0.21373		0.10902	
123	PANDHARPUR	Ambechincholi	17.603	75.515	9	3	6		0.11	0.1	
124	PANDHARPUR	Anawali	17.625	75.376	9	2.7	6.3		0.08389	0.0053	
125	PANDHARPUR	Bardi	17.864	75.296	9.7	7.7	2	0.02274		0.06884	
126	PANDHARPUR	Bhalawani	17.696	75.133	8.2	4	4.2		0.04333	0.01233	
127	PANDHARPUR	Bhandi Shegaon	17.713	75.214	10	4.2	5.8		0.01472	0.01647	
128	PANDHARPUR	Bhose	17.807	75.283	7.1	3.7	3.4		0.03194	0.07588	
129	PANDHARPUR	Eklaspur	17.604	75.389	10	3.9	6.1	0.05694		0.01201	
130	PANDHARPUR	Gardi	17.64	75.149	10	5.3	4.7	0.08278		0.09335	
131	PANDHARPUR	Gurasale	17.738	75.317	10	3.3	6.7	0.00202		0.03373	
132	PANDHARPUR	Ishwarwathar	17.722	75.408	6.8	1	5.8	0.2		0.07	
133	PANDHARPUR	Jaloli	17.889	75.235	8.3	3.7	4.6	0.02056		0.00327	
134	PANDHARPUR	Karkamb	17.864	75.296	10.6	0.7	9.9	0.02306		0.01843	
135	PANDHARPUR	Kasegaon	17.63	75.329	8.95	2.1	6.85	0.01163		0.02	
136	PANDHARPUR	Kharsoli	17.676	75.464	10.5	5.2	5.3	0.12333		0.04519	
137	PANDHARPUR	Sangavi	17.883	75.217	9.7	5	4.7	0.15778		0.059	
138	PANDHARPUR	Shirgaon	17.588	75.422	6.4	1.7	4.7	0.0075		0.03933	
139	PANDHARPUR	Wakhari	17.686	75.285	8	2.1	5.9	0.04644			0.09567
140	SANGOLE	Achakadani	17.533	75.056	12.9	1.9	11	0.00524		0.05305	

141	SANGOLE	Ajanale-Ligadewadi	17.425	75.071	7.8	1.4	6.4	0.00042		0.06954	
142	SANGOLE	Bamani	17.481	75.239	7	2.2	4.8		0.11614	0.00977	
143	SANGOLE	Dongargaon	17.334	75.218	8.6	4.4	4.2	0.02345			0.14596
144	SANGOLE	Hangirage	17.239	75.294	15.9	6.6	9.3	0.25154		0.01429	
145	SANGOLE	Hatid	17.289	75.039	8.65	3	5.65	0.11		0.05	
146	SANGOLE	Javala	17.317	75.219	6.6	6.2	0.4		0.07333	0.12975	
147	SANGOLE	Jujarpur	17.246	75.042	16	3.1	12.9	0.37653		0.06081	
148	SANGOLE	Junoni	17.233	75	13	3.9	9.1	0.1027		0.05255	
149	SANGOLE	Kamalapur	17.406	75.139	7.2	1.9	5.3	0.24		0.06	
150	SANGOLE	Pachegaon Bk	17.197	74.893	9.3	7.6	1.7	0.11509		0.04904	
151	SANGOLE	Pachegaon Kh	17.313	75.044	6	4	2		0.00105	0.01495	
152	SANGOLE	Pare	17.22	75.263	9.1	1.4	7.7		0.26686		0.15202
153	SANGOLE	Rajapur	17.342	75.272	7.8	3.7	4.1		0.34184	0.04221	
154	SANGOLE	Sonand	17.278	75.167	8.7	6.5	2.2		0.13607	0.05434	
155	SANGOLE	Tippehali	17.217	74.964	14.9	6.2	8.7	0.27313		0.37535	
156	SANGOLE	Vazare	17.386	75.047	10.65	3.8	6.85	0.05		0.05	
157	SANGOLE	Wadegaon	17.35	75.242	6.9	4.4	2.5	0.04548		0.10764	
158	SOLAPUR NORTH	Akolekati	17.796	75.839	8.6	2.75	5.85	0.05373		0.10192	
159	SOLAPUR NORTH	Kalman	17.931	75.783	8.4	1.3	7.1	0.04529			0.05645
160	SOLAPUR NORTH	Karamba	17.769	75.868	10.3	3.2	7.1	0.18706			0.07517
161	SOLAPUR NORTH	Mardi	17.803	75.9	7.85	5.2	2.65	0.05931		0.01517	
162	SOLAPUR NORTH	Wadala	17.875	75.833	13.9	6.9	7	0.08609		0.09252	
163	SOLAPUR SOUTH	Aurad	17.39	75.907	8.4	6.1	2.3	0.00902		0.03011	
164	SOLAPUR SOUTH	Bankalgi	17.492	75.971	18.9	10.6	8.3	0.17657			0.07087
165	SOLAPUR SOUTH	Dhotri	17.674	76.084	9	3	6	0.00049		0.02014	
166	SOLAPUR SOUTH	Dindur	17.618	76.092	4.8	3.1	1.7	0.07851		0.01481	
167	SOLAPUR SOUTH	Hotgi	17.589	75.978	12	5	7	0.00725		0.10381	
168	SOLAPUR SOUTH	Kandalgaon	17.542	75.758	4.1	1.2	2.9	0.11049		0.05963	

169	SOLAPUR SOUTH	Kumbhari	17.647	75.994	9.4	6.6	2.8		0.03431	0.30313	
170	SOLAPUR SOUTH	Mandrup	17.492	75.825	9.25	6.1	3.15		0.07834	0.03978	
171	SOLAPUR SOUTH	Musti	17.726	76.091	9.9	9.9	0	0.02518		0.06686	
172	SOLAPUR SOUTH	Nandani	17.457	75.851	11.6	4.9	6.7		0.04765	0.04076	
173	SOLAPUR SOUTH	Takali	17.492	75.825	3	0.4	2.6		0.15941	0.00533	
174	SOLAPUR SOUTH	Tandulwadi	17.703	75.087	8	2.3	5.7	0.05143			0.05299
175	SOLAPUR SOUTH	Vadapur	17.536	75.663	12.35	7.1	5.25	0.09329		0.08172	
176	SOLAPUR SOUTH	Vinchur	17.536	75.663	7.3	6	1.3	0.00341		0.27087	
177	SOLAPUR SOUTH	Yelegaon	17.515	75.79	6.8	3.8	3	0.09894		0.01443	

Annexure-III: Details of GW monitoring wells and KOWs in Solapur district.

SN	Date of establishment	Taluka	Village	Lat. Dec.	Long. Dec.	Elevation (m amsl)	Depth mbgl	Dia (m)	Geology	Aquifer	Lining (m)	MP (magl)	DTW mbgl (May 2017)	DTW mbgl (Nov 2017)	EC (May 2017)
1	26-04-2017	Karmala	Bhalavni	18.209	75.217	521.4	7	5	BS01	FMB	_	GL	6	4	1617
2	28-04-2017	Karmala	Bhilarwadi	18.331	74.896	552.7	13.5	3.5	BS01	WB	2.8	0.8	13.1	6.2	1764
3	25-04-2017	Karmala	Bitargaon (wangi)	18.140	75.125	504.7	9	6	BS01	WB	4	0.8	9	8.5	954
4	26-04-2017	Karmala	Chikhalthan	18.241	75.055	528.8	13	6	BS01	F&WMB	_	GL	11	5.8	1835
5	26-04-2017	Karmala	Deolali	18.366	75.170	594.1	10	8.5	BS01	WB	2	0.7	6.1	5.7	2230
6	27-04-2017	Karmala	Hisare	18.346	75.281	543.9	13	8.5	BS01	FMB	_	GL	9.4	3.8	1384
7	27-04-2017	Karmala	Hivare	18.349	75.322	533.3	10	8x8	BS01	F&WMB	8	GL	8	2.1	1436
8	26-04-2017	Karmala	Kamone	18.484	75.213	541.1	18	6	BS01	WB	10	0.1	16.3	5.6	1136
9	27-04-2017	Karmala	Karanje	18.406	75.259	519.9	15	8	BS01	WB	5.5	0.7	10.5	6.5	533
10	25-04-2017	Karmala	Kavitgaon	18.154	75.207	513.6	10	3.5	BS01	F&WMB	5	0.9	9	2.2	2352
11	26-04-2017	Karmala	Kedgaon	18.272	75.078	513.3	11	8.5	BS01	WB	1	0.2	10	7	1170
12	27-04-2017	Karmala	Kem	18.168	75.265	536.5	10	8.5	BS01	V&WB	3.5	0.5	12	5.1	933
13	28-04-2017	Karmala	Ketur	18.277	74.962	503	8.5	6	BS01	F&WMB	_	GL	7	2	1314
14	26-04-2017	Karmala	Khadaki	18.522	75.207	538.9	15	3.5	BS01	WB	8	0.8	12.4	7.2	981
15	28-04-2017	Karmala	Khatgaon	18.270	74.880	511	5	5	BS01	FMB	_	GL	4.1	2.9	1211
16	28-04-2017	Karmala	Kondhar Chincholi	18.284	74.816	501.2	11	5.5	BS01	WB	10	0.5	10.6	7	3375
17	27-04-2017	Karmala	Kondhej	18.274	75.198	541.3	15	10	BS01	F&WMB	3.3	0.2	12	3.8	745
18	26-04-2017	Karmala	Kugaon	18.218	75.034	519.4	8.5	6	BS01	WB	_	0.2	8	6.2	1149
19	27-04-2017	Karmala	Lavhe	18.246	75.192	523.2	18	6	BS01	WB	_	GL	17.5	17.1	1277
20	26-04-2017	Karmala	Limbewadi	18.491	75.133	546.8	10.5	3.5	BS01	WB	_	GL	8.4	6	606
21	27-04-2017	Karmala	Nerle	18.281	75.362	504	15	8.5	BS01	F&WMB	2	1	13	6.7	1288
22	25-04-2017	Karmala	Pangare	18.186	75.179	521.2	10.5	8.5	BS01	FMB	3	0.8	9	3	2049
23	28-04-2017	Karmala	Parewadi	18.302	74.964	515	10	6	BS01	WB	_	GL	9.5	4	1688

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24	27-04-2017	Karmala	Pathurdi	18.218	75.299	541.6	10	3.5	BS01	F&WMB	—	GL	12	7.8	895
25	28-04-2017	Karmala	Pondhvadi	18.360	75.045	558.6	10	6	BS01	V&WB	—	GL	9.5	1.5	504
26	27-04-2017	Karmala	Pophalaj	18.290	75.117	542.5	10.5	8	BS01	F&WMB	1.5	GL	10	8.5	2520
27	27-04-2017	Karmala	Potegaon	18.475	75.280	559.1	12		BS01	F&WMB			10.7	6.8	3702
28	26-04-2017	Karmala	Pothare	18.441	75.216	526.9	9.5	3.5	BS01	F&WMB	2.3	0.4	9.1	3	3228
29	27-04-2017	Karmala	Sade	18.288	75.269	543.1	12	8.5	BS01	WB	1	0.4	11	6.6	1464
30	27-04-2017	Karmala	Sade	18.282	75.268	549.4	23	6	BS01	WB	—	GL	22	5.2	966
31	27-04-2017	Karmala	Sade	18.316	75.286	561.1	23	6	BS01	WB	—	GL	22.9	13.6	811
32	25-04-2017	Karmala	Shelgaon (wangi)	18.245	75.142	555	10	3.5	BS01	F&WMB	—	0.5	9	3	1618
33	27-04-2017	Karmala	Sogaon	18.287	75.038	520.6	13	7	BS01	F&WMB	8	0.2	11.9	7	1675
34	28-04-2017	Karmala	Takali (rashin)	18.261	74.865	505.2	5	6	BS01	F&WMB	—	GL	4.5	1	656
35	27-04-2017	Karmala	Umradi	18.315	75.066	499.4	16	10.5	BS01	F&WMB	3	0.8	12.3	5.1	1896
36	26-04-2017	Karmala	Vanjarwadi	18.421	75.098	592.1	13	6	BS01	WB	3	0.5	11.7	6.5	1207
37	25-04-2017	Karmala	Wangi	18.211	75.128	527.3	10.5	6	BS01	WB	5.5	0.6	10	4.1	1808
38	27-04-2017	Karmala	Warkatne	18.293	75.214	565.1	10.5	6.5	BS01	WB	—	GL	8.1	5.1	1581
39	25-04-2017	Madha	Adhegaon	18.036	75.112	500.2	10	5	BS01	FMB	0.5	GL	9.1	4.5	2386
40	23-04-2017	Madha	Akulgaon	18.132	75.450	495.9	15	6	BS01	WB	7	0.2	14.1	1.5	1561
41	24-04-2017	Madha	Anjangaon Umate	18.082	75.584	471.6	14	5	BS01	WB		GL	13.5	2.7	778
42	24-04-2017	Madha	Anjangaon(kh)	17.960	75.563	483.3	10.5	5	BS01	F&WMB	2.3	GL	9	4	1766
43	23-04-2017	Madha	Badalewadi	18.098	75.290	547	12.5	6	BS01	F&WMB		GL	11	6	1234
44	23-04-2017	Madha	Bhend	17.993	75.361	542.2	17	8.5	BS01	F&WMB	5	0.3	15.9	7.1	1051
45	25-04-2017	Madha	Dahiwali	18.095	75.239	530.4	14	6	BS01	WB	2	0.1	13.1	2.1	2781
46	24-04-2017	Madha	Dhanore	18.002	75.686	495.3	9	8x8	BS01	WB	1	GL	5.9	2.7	1718

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47	25-04-2017	Madha	Gar Akole	17.968	75.037	480.2	6	8.5	BS01	WB	2	0.6	5.3	2	1342
48	23-04-2017	Madha	Gavalewadi	18.137	75.390	529.7	8.5	3.5	BS01	WB	5	1	7.3	6	2519
49	23-04-2017	Madha	Ghoti	17.930	75.225	504	19	7.5	BS01	F&WMB	7.6	0.6	17	3.1	2248
50	23-04-2017	Madha	Jakhale	18.167	75.328	540.2	8.5	3.5	BS01	F&WMB	6	1	7.2	4.3	2375
51	24-04-2017	Madha	Kurdu	18.081	75.396	515.1	12	3.5	BS01	F&WMB	4.5	0.7	5.4	4.7	1961
52	23-04-2017	Madha	Laul	18.035	75.394	527.2	16	6.5	BS01	FMB	4	0.3	14	2	4204
53	22-04-2017	Madha	Malegaon	17.983	75.176	491.8	8	6	BS01	F&WMB	1	GL	8	5.4	1002
54	24-04-2017	Madha	Manegaon	17.985	75.652	486.6	12	3.5	BS01	WB	10	0.8	10	3.5	1463
55	24-04-2017	Madha	Manegaon	18.010	75.609	470.2	15	6	BS01	F&WMB	1	GL	11.1	4.1	1024
56	24-04-2017	Madha	Mhaisgaon	18.116	75.492	498	15	6	BS01	WB	3	0.3	15	13.5	3232
57	23-04-2017	Madha	Modnimb	17.944	75.398	522.4	23	6	BS01	F&WMB	5	0.5	22.8	9.2	1350
58	24-04-2017	Madha	Papnas	18.106	75.532	480.9	22	7	BS01	F&WMB	1	0.5	19.1	4.4	2338
59	23-04-2017	Madha	Paritewadi	17.952	75.291	512	23	6	BS01	V&WB, FMB	1	0.3	22.7	14	753
60	24-04-2017	Madha	Pimpalner	18.048	75.296	527.9	12	5.4	BS01	F&WMB	5.4	0.7	6.8	3.6	1852
61	24-04-2017	Madha	Ridhore	18.128	75.541	477.9	12	8.5	BS01	WB	6	1	11	1.9	3797
62	22-04-2017	Madha	Shiral Tembhorni	18.045	75.150	514.8	15	10.5	BS01	F&WMB	3	0.6	8.6	6.8	1712
63	22-04-2017	Madha	Shiral Tembhorni	18.077	75.167	516.8	14.5	6	BS01	F&WMB	-	GL	14.2	5	1437
64	25-04-2017	Madha	Takali Tembhorni	17.993	75.073	491.1	10	6	BS01	F&WMB	1	0.1	9	6	1171
65	23-04-2017	Madha	Tulshi	17.953	75.333	537	15	8.5	BS01	F&WMB	4.5	0.1	13.5	3.9	1809
66	23-04-2017	Madha	Venegaon	18.024	75.234	512.4	9	3.35	BS01	WB	4.5	0.7	7.8	1.6	2477
67	24-04-2017	Madha	Wadachiwadi	17.969	75.474	507.6	24	5	BS01	F&WMB	1	0.1	21	2.6	1152
68	24-04-2017	Madha	Wadachiwadi	18.078	75.622	495.8	20	7	BS01	WB	7.2	0.8	12.3	4.7	560

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69	24-04-2017	Madha	Wadshinge	18.070	75.513	496	22	6	BS01	F&WMB	6	0.3	20.5	4.6	2285
70	23-04-2017	Madha	Warawade	17.979	75.302	508.2	15	6	BS01	F&WMB	1	GL	13	1.6	914
71	16-06-2017	Mohol	Ashti	17.863	75.408	483.5	11	6.5	BS01	F&WMB	6	GL	10	2.8	1882
72	13-06-2017	Mohol	Bhambewadi	17.841	75.700	480.3	13	7	BS01	F&WMB	7	GL	7.3	5.2	985
73	10-06-2017	Mohol	Bitle	17.893	75.609	468.8	10	5.5	BS01	F&WMB	4	GL	9.3	3	1507
74	10-06-2017	Mohol	Dadapur	17.709	75.739	444.3	13	3.2	BS01	F&WMB	6	0.8	5.5	3.7	1187
75	10-06-2017	Mohol	Ghorpadi	17.949	75.708	463	10	5	BS01	F&WMB	3	0.6	7	2.5	1287
76	09-06-2017	Mohol	Hivare	17.894	75.527	486	16	8.5	BS01	F&WMB	6.3	0.5	15.2	2	1133
77	10-06-2017	Mohol	Katewadi	17.731	75.697	449.3	12	8	BS01	F&WMB	4.5	GL	7.5	6.9	5119
78	09-06-2017	Mohol	Khandali	17.868	75.463	505.8	17	8.5	BS01	F&WMB	1	GL	19	12	
79	13-06-2017	Mohol	Kolegaon	17.791	75.697	460.4	14	6.5	BS01	F&WMB	3	0.9	13.5	4	640
80	09-06-2017	Mohol	Konheri	17.846	75.515	508.1	14.5	7	BS01	F&WMB	0	GL	13.1	5.2	623
81	10-06-2017	Mohol	Maslechaudhari	17.913	75.722	470.2	24	8.5	BS01	Soil, FB	20	1	23.5	10	1136
82	10-06-2017	Mohol	Mohol	17.840	75.638	495.4	13.5	7	BS01	F&WMB	8	GL	11.2	6.1	1805
83	14-06-2017	Mohol	Patkul	17.777	75.517	491.3	10	3.2	BS01	F&WMB	5	GL	8.3	5.1	513
84	13-06-2017	Mohol	Penur	17.800	75.497	486	14	7.5	BS01	WB	5	0.4	12.2	5.2	856
85	13-06-2017	Mohol	Pokharapur	17.836	75.597	489.1	11	7.5	BS01	F&WMB	5	0.2	10.2	7	359
86	10-06-2017	Mohol	Sayyadwarwade	17.734	75.640	486.6	9	3.5	BS01	Soil, WB	9	0.8	8.3	7.5	2712
87	10-06-2017	Mohol	Sohale	17.662	75.646	477.3	10	7	BS01	F&WMB	1	GL	9	5.2	2234
88	14-06-2017	Mohol	Takali (shikandar)	17.733	75.549	479.1	22.8	8.5	BS01	F&WMB	2.8	GL	21	18.5	1158
89	10-06-2017	Mohol	Watwate	17.578	75.685	470.4	13.5	7	BS01	F&WMB	3.5	1	11.4	6	1486
90	10-06-2017	Mohol	Watwate	17.597	75.701	472.3	12	10	BS01	F&WMB	0	GL	8.4	5.8	1163
91	13-06-2017	Mohol	Wirwade Kh	17.752	75.756	455.6	15	7.5	BS01	WB	0	GL	14.5	5	1585

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92	13-06-2017	Mohol	Yeoti	17.820	75.464	483.6	16	10.5	BS01	F&WMB	3.3	0.5	13	6.7	837
93	16-06-2017	Pandharpur	Adhiv	17.730	75.366	474.6	22	8.5	BS01	F&WMB	4	1	21	8.6	1599
94	16-06-2017	Pandharpur	Adhiv	17.763	75.377	487.2	20.5	8.5	BS01	F&WMB	4	0.6	12.2	5.1	1071
95	14-06-2017	Pandharpur	Ambe	17.653	75.473	448.2	10	8.5	BS01	WB	2	GL	8	4.3	2468
96	14-06-2017	Pandharpur	Ambechincholi	17.631	75.539	444.8			BS01	F&WMB			12.5	9.5	1750
97	17-06-2017	Pandharpur	Badalkot	17.864	75.219	460.7	10	7.5	BS01	F&WMB	6	GL	9	4	1808
98	16-06-2017	Pandharpur	Bhose	17.831	75.300	487.3	18	9	BS01	F&WMB	0	GL	14	9.2	1235
99	14-06-2017	Pandharpur	Chale	17.723	75.457	450	13	8.5	BS01	F&WMB	3.7	0.2	10.5	9.25	3144
100	15-06-2017	Pandharpur	Dhondewadi	17.728	75.167	489.5	8.5	4.5	BS01	FMB	0	GL	8	3.2	1836
101	16-06-2017	Pandharpur	Hole	17.780	75.294	465	10	8x8	BS01	WB	0	GL	7.3	2.1	3529
102	14-06-2017	Pandharpur	Ite (Puluj)	17.687	75.506	465.2	12.5	6.5	BS01	F&WMB	0	GL	12	7.6	1856
103	15-06-2017	Pandharpur	Jainwadi	17.694	75.138	499.4	8	6.5	BS01	F&WMB	0	GL	7	3.5	1428
104	16-06-2017	Pandharpur	Karole	17.887	75.151	483.8	6	8x8	BS01	F&WMB	0	GL	7	3.5	3463
105	15-06-2017	Pandharpur	Kasegaon	17.659	75.347	465.7	10	8.5	BS01	F&WMB	4	GL	9	7.2	1615
106	15-06-2017	Pandharpur	Khardi	17.563	75.294	482.9	14	7.5	BS01	F&WMB	2	GL	15	4.4	2173
107	15-06-2017	Pandharpur	Korty	17.642	75.273	476.1	10	6.5	BS01	WB	0.8	GL	8	5.1	1188
108	16-06-2017	Pandharpur	Mendhapur	17.796	75.357	495.2	12	8.5	BS01	F&WMB	7	1	12	11.8	556
109	15-06-2017	Pandharpur	Palshi	17.654	75.199	490.1	12.5	6.5	BS01	WB	0	GL	12	3	1508
110	16-06-2017	Pandharpur	Patvardhan Kuroli	17.808	75.217	491.6	8	6.5	BS01	F&WMB	0	GL	7.7	6.5	1343
111	14-06-2017	Pandharpur	Siddhewadi	17.590	75.433	452.6	13	9.5	BS01	F&WMB	1	GL	12	6.1	2612
112	15-06-2017	Pandharpur	Sonke [n.v.]	17.618	75.194	513.9	9	3.5	BS01	WB	0	GL	8	1	568
113	15-06-2017	Pandharpur	Tanali	17.572	75.337	468.1	24	8.5	BS01	F&WMB	3	0.4	23.5	9.2	2112
114	16-06-2017	Pandharpur	Umbare	17.906	75.196	507.6	10	6.5	BS01	F&WMB	3	1	6	3.4	1702
115	12-06-2017	Solapur South	Balgi	17.449	75.777	448.3	12	8.5x8.5	BS01	F&WMB	0	GL	9.1	4.8	1622
116	11-06-2017	Solapur South	Bankalgi	17.484	75.993	475.8	15.5	6	BS01	WB	0	GL	15	13	1166

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117	12-06-2017	Solapur South	Bhandar Kavathe	17.414	75.711	433.6			BS01	F&WMB			8.5	1.9	289
118	11-06-2017	Solapur South	Borul	17.517	76.027	452.1	30	9.5	BS01	F&WMB	6	0.7	22.9	13	1066
119	11-06-2017	Solapur South	Darganhalli	17.686	76.033	501.1	12	7x7	BS01	WB	0	GL	12	11	1033
120	11-06-2017	Solapur South	Dhotri	17.672	76.086	511.3	8.5	6	BS01	F&WMB	5.7	1	5.6	4.3	1827
121	13-06-2017	Solapur South	Gangewadi	17.832	75.986	502.8	12	6	BS01	F&WMB	4	0.8	10.8	9.2	1081
122	12-06-2017	Solapur South	Hatur	17.553	75.935	438.3	10	6.5	BS01	F&WMB	3	GL	13	7	7112
123	11-06-2017	Solapur South	Hipale	17.557	76.041	461.6	10.5	8.5	BS01	F&WMB	0	GL	8.5	4.9	1331
124	12-06-2017	Solapur South	Honmurgi	17.518	75.895	435	30		BS01	F&WMB		1	11.4	8.1	7845
125	11-06-2017	Solapur South	Hotgi	17.601	75.992	467	11.5	8.5x8.5	BS01	WB	0	GL	11.2	5	854
126	11-06-2017	Solapur South	Kanbas	17.470	76.054	442.2	10	8.5	BS01	WB	0	GL	12	5	2195
127	12-06-2017	Solapur South	Kandalgaon	17.551	75.786	452.9	12	6.5	BS01	WB	0	GL	11.5	6	763
128	11-06-2017	Solapur South	Kandehalli	17.644	76.045	493.4	12.5	8	BS01	F&WMB	7	0.3	11.5	9.6	1592
129	11-06-2017	Solapur South	Kumbhari	17.651	75.991	478.8	14	2.6	BS01	WB	12	0.5	9.6	6.4	1519
130	12-06-2017	Solapur South	Kurghot	17.458	75.853	454.3	6	6	BS01	WB	0	GL	7	3.2	2088
131	12-06-2017	Solapur South	Kusur	17.524	75.724	463.6	12	8.5	BS01	Soil, WB	0	GL	11	5	4037
132	13-06-2017	Solapur South	Mulegaon	17.688	75.973	478.2	12	6	BS01	F&WMB	5	0.9	9.5	8	1935
133	11-06-2017	Solapur South	Musti	17.735	76.127	490.4	18	6.5	BS01	F&WMB	0	GL	17	14.1	1362
134	12-06-2017	Solapur South	Nimbargi	17.483	75.793	460.6	10	8.5	BS01	WB	6	GL	12	5.2	0
135	11-06-2017	Solapur South	Phatatewadi	17.570	75.978	466.8	9.5	6	BS01	F&WMB	0	GL	9	4.5	878
136	12-06-2017	Solapur South	Sadepur	17.413	75.792	442.2	12	8.5x8.5	BS01	F&WMB	0	GL	10	6.8	2952
137	11-06-2017	Solapur South	Tandulwadi	17.759	76.059	528.2	10	6	BS01	F&WMB	0	GL	9	7	126
138	12-06-2017	Solapur South	Telgaon Mandrup	17.471	75.706	441			BS01				10.6	3.1	2614
139	11-06-2017	Solapur South	Valsang	17.593	76.090	480	12	8.5	BS01	F&WMB	10	0.9	5.6	1.4	506
140	13-06-2017	Solapur South	Waralegaon	17.734	75.983	476.8	17.5	8.5	BS01	WB	0	GL	16.7	13.5	704

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141		Malshiras	Bhamb	17.796	74.792	600.2	19	9.5	BS01	F&WMB	1.5	1	18.3	5.8	1264
142		Malshiras	Chaundeshwarwadi	17.857	75.036	497.7	12.5	4.5	BS01	WVB	4.5	GL	8.9	4.8	1060
143		Malshiras	Dasur	17.776	75.137	471.2	26	10	BS01	WVB	7.5	0.3	22.3	4.9	690
144		Malshiras	Deshmukhwadi	18.002	74.691	515.2	14	10	BS01	WVB	2.5	GL	7.56	5.9	2775
145		Malshiras	Fadtari	17.834	74.712	614.2	15	8	BS01	F&WMB	6	0.4	11.5	5.1	718
146		Malshiras	Fondshiras	17.921	74.813	511	16	6.5	BS01	WB	2	GL	13	6.1	1160
147		Malshiras	Girzani	17.862	74.980	505.3	19	10	BS01	WMB	6	1	13.6	5.3	2090
148		Malshiras	Jambud	17.847	75.146	491.1	18	6	BS01	WB	6	1.5	15	5.63	1895
149		Malshiras	Kanher	17.812	74.843	546.1	18	8	BS01	FMB	4.9	GL	16.5	5.1	3032
150		Malshiras	Khudus	17.831	74.960	523.7	15	6	BS01	WB	3.5	0.3	10.3	4.8	778
151		Malshiras	Maloli	17.748	75.047	488.7	13	6	BS01	WMB	2.1	GL	10	3.6	956
152		Malshiras	Mandave	17.880	74.808	521.9	19.5	6.5	BS01	W&VB	0	GL	16.2	5.2	1864
153		Malshiras	Nimgaon	17.778	74.989	519.8	8	3	BS01	FB	2	0.4	8	6.1	2100
154		Malshiras	Palasmandal	17.979	74.826	515	14	7.5	BS01	WB	2.5	1	13.2	5.8	4246
155		Malshiras	Sangam	17.940	75.135	485	22	8	BS01	WB	6	0.5	21	4.3	2870
156		Malshiras	Shingorni	17.630	75.009	548.2	13	3	BS01	FB	3	GL	9.35	6.8	1265
157		Malshiras	Tambave	17.905	75.092	496	25	10	BS01	WB	3	0.7	20.1	2.2	2400
158		Malshiras	Tarangfal	17.756	74.913	581.2	14	5.6	BS01	WMB	3.6	GL	7.9	3.85	1355
159		Malshiras	Tirwandi	17.916	74.898	496	18	10	BS01	FMB	4.5	1.5	15.6	8.56	1130
160		Malshiras	Ughadewadi	17.803	75.097	490.3	16	4.5	BS01	Basalt	3	0.6	14	4.56	2154
161		Malshiras	Bacheri	17.649	74.968	572	7.7		BS01				9	3.2	
162		Malshiras	Dharmपुरi	17.939	74.675	549.3	7.95		BS01				7	5.25	
163		Malshiras	Foundshiras	17.932	74.813	504	10		BS01				8.6	5.6	
164		Malshiras	Gursale	17.878	74.668	624.1	6.5		BS01				4.7	4.2	
165		Malshiras	Jalbhavi	17.754	74.847	594.3	7.95		BS01				7.7	5	

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166		Malshiras	Karunde	17.908	74.761	535	10.85		BS01				10.8	4.7	
167		Malshiras	Khudus	17.825	74.842	544	4.95		BS01				6	2.5	
168		Malshiras	Kothale	17.871	74.639	639.3	10.15		BS01				10.1	5.9	
169		Malshiras	Kurbavi	18.022	74.721	509	6.5		BS01				7	6.5	
170		Malshiras	Lawang	17.883	75.126	457	12		BS01				10.8	3.35	
171		Malshiras	Malshiras	17.864	74.911	527.2	8.4		BS01				9	2.7	
172		Malshiras	Natepute	17.897	74.756	535.6	6		BS01				6	3.9	
173		Malshiras	Piliv	17.683	74.967	542	12		BS01				9	8	
174		Malshiras	Tandulwadi	17.703	75.087	500	7.2		BS01				8	2.3	
175		Malshiras	Tarangfal	17.778	74.925	552.3	8.2		BS01				6.4	4.5	
176		Malshiras	Malkhambi	17.751	75.119	486.7	11		BS01				9.1	6	
177		Malshiras	Dharpuri	17.933	74.683	543.52	8.7		BS01			1.2	7.5	7.1	
178		Malshiras	Malsiras	17.867	74.900	529.88	8.95		BS01			0.95	8	6	
179		Malshiras	Natepute-1	17.893	74.739	549	7.3		BS01			0.5	7	5.83	
180		Malshiras	Piliv	17.682	74.967	765.62	10.55		BS01			0.85	7.53	6.61	
181		Malshiras	Salmukh	17.694	75.042	523.21	8.85		BS01			0.8	8	2.86	
182		Malshiras	Velapur	17.800	75.050	494.54	9.92		BS01			0.92	7.95	5.9	
183		Akkalkot	Arali	17.674	76.159	468	10		BS01				10	6.4	
184		Akkalkot	Basalegaon	17.449	76.288	433.3	10.1		BS01				8	2.9	
185		Akkalkot	Binjger	17.400	76.325	431	11.75		BS01				10.5	5.3	
186		Akkalkot	Borgaon	17.650	76.313	475	8.4		BS01				8	6.1	
187		Akkalkot	Chapalgaon	17.608	76.175	474	11.35		BS01				9.1	6.7	
188		Akkalkot	Chikkahalli	17.600	76.179	500	10.6		BS01				10.1	3.1	
189		Akkalkot	Chungi	17.661	76.229	461.4	10.6		BS01				8	6.9	
190		Akkalkot	Dudhani (Rural)	17.588	76.268	454.1	15.9		BS01				9.2	8.6	

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191		Akkalkot	Gogaon	17.623	76.400	532.6	8.85		BS01				7.3	3.4	
192		Akkalkot	Hannur	17.424	76.271	427.5	11.2		BS01				6.6	3.1	
193		Akkalkot	Jeur	17.479	76.108	442.2	11.5		BS01				10.6	6.7	
194		Akkalkot	Kajikanbas	17.713	76.283	517.8	9.75		BS01				9.6	3	
195		Akkalkot	Karjal	17.564	76.117	475.6	13.2		BS01				12.8	3	
196		Akkalkot	Kini	17.683	76.265	493.6	11.4		BS01				11.4	6.1	
197		Akkalkot	Kurnur	17.631	76.217	458.4	14.5		BS01				7.4	3	
198		Akkalkot	Satan Dudhani	17.426	76.268	427.9	9.35		BS01				9.3	4	
199		Akkalkot	Sultanpur	17.694	76.231	477.1	7.5		BS01				7.5	2.5	
200		Akkalkot	Udagi	17.433	76.225	451	8.15		BS01				8.1	3.7	
201		Akkalkot	Wagdari	17.600	76.358	534.9	9.35		BS01				9.2	2.5	
202		Barshi	Agalgaon	18.317	75.746	548.9	13.15		BS01				8.9	3.1	
203		Barshi	Alipur	18.215	75.662	502	15.65		BS01				7.9	3.5	
204		Barshi	Chare	18.349	75.807	599.3	7.56		BS01				7	2.2	
205		Barshi	Chikharde	18.208	75.832	525.4	9.9		BS01				8.9	2.3	
206		Barshi	Gaudgaon	18.063	75.972	527.6	10		BS01				8.6	2.25	
207		Barshi	Jamgaon	18.157	75.863	518.4	12.65		BS01				7.7	3	
208		Barshi	Kalambawadi	18.375	75.754	592.9	9		BS01				7.5	3.8	
209		Barshi	Kari	18.240	75.913	554.4	9		BS01				8	0.6	
210		Barshi	Kuslamb	18.281	75.774	559	12		BS01				5.8	0.5	
211		Barshi	Malwandi	18.058	75.658	498.7	10.85		BS01				7.6	2	
212		Barshi	Nandani	18.108	75.836	515	8.1		BS01				8	3	
213		Barshi	Pangaon	18.138	75.737	508.1	9.35		BS01				8	3.05	
214		Barshi	Raleras	18.006	75.814	483	7.85		BS01				7	2.4	
215		Barshi	Shendri	18.176	75.558	504.7	18.25		BS01				10.9	6	

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216		Barshi	Vairag	18.056	75.804	491.6	18.9		BS01				16	3.8	
217		Karmala	Alsunde	18.283	75.313	522	7.6		BS01				7.55	3.1	
218		Karmala	Arjunnagar	18.329	75.283	543	7.15		BS01				7.8	3	
219		Karmala	Bhalavni	18.207	75.200	514	16.4		BS01				8.1	2	
220		Karmala	Bhilarwadi	18.342	74.896	549.2	19.4		BS01				18	4.5	
221		Karmala	Bhose	18.429	75.171	544.9	12		BS01				12	3	
222		Karmala	Borgaon	18.426	75.263	508	12.75		BS01				12.75	7.9	
223		Karmala	Deolali	18.372	75.186	562.5	7		BS01				6.5	1	
224		Karmala	Ghargaon	18.479	75.293	555.5	7.35		BS01				7.35	2	
225		Karmala	Jategaon	18.506	75.185	565.4	13.5		BS01				13.5	2.9	
226		Karmala	Jinti	18.354	74.886	559.7	7.95		BS01				7.8	3	
227		Karmala	Karmala	18.400	75.197	563.4	9		BS01				8.5	2	
228		Karmala	Kavitgaon	18.154	75.200	506.9	5.5		BS01				5.2	0.5	
229		Karmala	Kedagaon	18.274	75.079	507	9.65		BS01				8.8	4	
230		Karmala	Kem	18.171	75.293	556.9	9.35		BS01				9.35	2.6	
231		Karmala	Ketur	18.288	74.954	510.9	8.45		BS01				8	0.7	
232		Karmala	Khadaki	18.533	75.228	528	13.61		BS01				13.61	2.1	
233		Karmala	Mangi	18.458	75.189	529.6	7.9		BS01				7.9	3.5	
234		Karmala	Padali	18.479	75.293	555.5	16.36		BS01				14.3	5	
235		Karmala	Pande	18.378	75.233	542.3	10.5		BS01				10.5	10	
236		Karmala	Pophalaj	18.293	75.117	546.2	13		BS01				10.8	1.6	
237		Karmala	Rajuri	18.335	75.002	530.8	9		BS01				8.1	2.8	
238		Karmala	Sarapdoh	18.313	75.214	570	9.85		BS01				8.1	2.4	
239		Karmala	Savadi	18.380	74.986	559	12		BS01				8.7	3.3	
240		Karmala	Shelgaon (Wangi)	18.344	75.247	545	12		BS01				7	2.7	

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241		Karmala	Veet	18.378	75.117	555	7.5		BS01				7.5	3.6	
242		Karmala	Warkute	18.250	75.333	519	7.7		BS01				7.7	3.1	
243		Madha	Adhegaon	18.036	75.117	504.4	8.4		BS01				6.5	1.3	
244		Madha	Ambad	18.071	75.347	539.8	9.65		BS01				9.65	5	
245		Madha	Aran	17.908	75.325	511.7	18		BS01				17.5	6	
246		Madha	Barloni	18.146	75.415	508	7.65		BS01				7.65	5	
247		Madha	Bavi	17.938	75.428	515.6	12.8		BS01				12.8	3.1	
248		Madha	Bhend	18.007	75.374	567.1	10.7		BS01				10.7	2.8	
249		Madha	Dhanore	18.003	75.688	492.7	10.5		BS01				9	3	
250		Madha	Kanhergaon	18.073	75.226	520.7	8.7		BS01				6.3	3.5	
251		Madha	Kewad	18.028	75.588	467.4	15.5		BS01				12	6.1	
252		Madha	Loni	18.246	75.396	500.2	6.7		BS01				6.7	0.9	
253		Madha	Madha	18.033	75.517	493.1	17.25		BS01				17.25	4.8	
254		Madha	Manegaon	17.989	75.652	485.6	19.2		BS01				15	2.6	
255		Madha	Modnimb	17.908	75.400	502.9	27.6		BS01				21	12.2	
256		Madha	Palwan	18.000	75.300	517	12		BS01				10	5	
257		Madha	Parite	17.979	75.243	489.9	12.2		BS01				12.2	4.5	
258		Madha	Tembhurni	18.026	75.192	502.3	9		BS01				6.5	3.6	
259		Madha	Tulshi	17.908	75.325	511	12.3		BS01				12.3	6	
260		Madha	Upalai Bk	17.967	75.492	498.2	16.65		BS01				12.3	4.5	
261		Madha	Warawade	17.967	75.308	516	8.5		BS01				8.4	2.4	
262		Mangalvedhe	Barmhapuri	17.560	75.556	455.3	8		BS01				8	3.1	
263		Mangalvedhe	Borale	17.494	75.585	451.2	14		BS01				13	4	
264		Mangalvedhe	Diksal	17.407	75.528	476.7	8		BS01				8	2.7	
265		Mangalvedhe	Jalihai	17.392	75.385	527.2	5		BS01				5.5	1.4	
266		Mangalvedhe	Kagasht	17.402	75.550	469.6	9		BS01				9	6.5	

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267		Mangalvedhe	Pout	17.342	75.529	474	8		BS01				8	4	
268		Mangalvedhe	Siddhankeri	17.367	75.419	523.7	8.35		BS01				8.35	3.5	
269		Mohol	Adhegaon	17.735	75.558	492.4	9.4		BS01				8.4	3.2	
270		Mohol	Arjunsod	17.751	75.724	450.2	13		BS01				7	2.3	
271		Mohol	Bairagwadi	17.979	75.700	481	11.9		BS01				11.8	3.6	
272		Mohol	Bhoire	17.872	75.675	467.3	14.9		BS01				13	1.4	
273		Mohol	Deodi	17.882	75.508	499.1	16		BS01				14.2	4	
274		Mohol	Galandwadi	17.896	75.576	470.6	11.8		BS01				9.2	2.89	
275		Mohol	Hivare	17.843	75.538	505.6	19.1		BS01				15.7	1.2	
276		Mohol	Ichgaon	17.601	75.604	466.3	8.2		BS01				6.9	2.5	
277		Mohol	Kamthi Kh	17.640	75.710	464.4	12.1		BS01				12.1	2.9	
278		Mohol	Kurul	17.676	75.661	473.3	21.9		BS01				18	4	
279		Mohol	Malikpeth	17.874	75.643	457	10.1		BS01				9	2	
280		Mohol	Maslechaudhari	17.915	75.731	466.3	11.5		BS01				12	7.5	
281		Mohol	Narkhed	17.904	75.678	458.3	10.85		BS01				7.5	3.2	
282		Mohol	Papri	17.825	75.475	489	19.55		BS01				15	4.7	
283		Mohol	Patkul	17.749	75.529	486	11.35		BS01				7.8	2.3	
284		Mohol	Pokharapur	17.800	75.596	475	14.1		BS01				11.2	3.5	
285		Mohol	Telangwadi	17.883	75.457	504.4	18.4		BS01				18.2	4.3	
286		Mohol	Wagholi	17.624	75.664	476.6	9.8		BS01				6.2	2.1	
287		Mohol	Warkute	17.689	75.596	471.3	10.9		BS01				9.2	3.5	
288		Mohol	Yawali	17.840	75.596	484.7	14.1		BS01				13.6	8.9	
289		Pandharpur	Ambechinholi	17.603	75.515	443.1	11.15		BS01				9	3	
290		Pandharpur	Anawali	17.625	75.376	472.7	9.65		BS01				9	2.7	
291		Pandharpur	Bardi	17.864	75.296	490	9.7		BS01				9.7	7.7	
292		Pandharpur	Bhalawani	17.696	75.133	498	12.5		BS01				8.2	4	

SN	Date of establishment	Taluka	Village	Lat. Dec.	Long. Dec.	Elevation (m amsl)	Depth mbgl	Dia (m)	Geology	Aquifer	Lining (m)	MP (magl)	DTW mbgl (May 2017)	DTW mbgl (Nov 2017)	EC (May 2017)
293		Pandharpur	Bhandi Shegaon	17.713	75.214	464.4	13.2		BS01				10	4.2	
294		Pandharpur	Bhose	17.807	75.283	474.2	10.2		BS01				7.1	3.7	
295		Pandharpur	Ekhaspur	17.604	75.389	473	10.6		BS01				10	3.9	
296		Pandharpur	Gardi	17.640	75.149	490.6	13.2		BS01				10	5.3	
297		Pandharpur	Gurasale	17.738	75.317	469.2	17		BS01				10	3.3	
298		Pandharpur	Ishwarwathar	17.722	75.408	450.6	6.8		BS01				6.8	1	
299		Pandharpur	Jaloli	17.889	75.235	485.9	8.35		BS01				8.3	3.7	
300		Pandharpur	Karkamb	17.864	75.296	490	14		BS01				10.6	3	
301		Pandharpur	Kasegaon	17.630	75.329	465.7	10.2		BS01				8.95	2.1	
302		Pandharpur	Kharsoli	17.676	75.464	455.6	25.1		BS01				21	5.2	
303		Pandharpur	Sangavi	17.883	75.217	486.8	10.6		BS01				9.7	5	
304		Pandharpur	Shirgaon	17.588	75.422	450.7	6.85		BS01				6.4	1.7	
305		Pandharpur	Wakhari	17.686	75.285	454.4	8		BS01				8	2.1	
306		Sangole	Achakadani	17.533	75.056	562.8	12.9		BS01				12.9	1.9	
307		Sangole	Ajanale-Ligadewadi	17.425	75.071	533	7.85		BS01				7.8	1.4	
308		Sangole	Bamani	17.481	75.239	481.3	7		BS01				7	2.2	
309		Sangole	Dongargaon	17.334	75.218	510.6	8.6		BS01				8.6	4.4	
310		Sangole	Hangirage	17.239	75.294	569.5	16.4		BS01				15.9	6.6	
311		Sangole	Hatid	17.289	75.039	545.8	8.65		BS01				8.65	3	
312		Sangole	Javala	17.317	75.219	514.5	10		BS01				6.6	6.2	
313		Sangole	Jujarpur	17.246	75.042	561.9	16		BS01				16	3.1	
314		Sangole	Junoni	17.233	75.000	577.1	14		BS01				13	3.9	
315		Sangole	Kamalapur	17.406	75.139	517.2	7.2		BS01				7.2	1.9	
316		Sangole	Pachegaon Bk	17.197	74.893	695.3	10.8		BS01				9.3	7.6	
317		Sangole	Pachegaon Kh	17.313	75.044	542	6		BS01				6	4	

SN	Date of establishment	Taluka	Village	Lat. Dec.	Long. Dec.	Elevation (m amsl)	Depth mbgl	Dia (m)	Geology	Aquifer	Lining (m)	MP (magl)	DTW mbgl (May 2017)	DTW mbgl (Nov 2017)	EC (May 2017)
318		Sangole	Pare	17.220	75.263	577.6	14		BS01				9.1	1.4	
319		Sangole	Rajapur	17.342	75.272	517.9	12.65		BS01				7.8	3.7	
320		Sangole	Sonand	17.278	75.167	537.5	12.2		BS01				8.7	6.5	
321		Sangole	Tippehali	17.217	74.964	627.8	16.3		BS01				14.9	6.2	
322		Sangole	Vazare	17.386	75.047	528.6	10.7		BS01				10.65	3.8	
323		Sangole	Wadegaon	17.350	75.242	514	14.4		BS01				6.9	4.4	

Annexure- IV: Chemical analysis of ground water samples, Shallow aquifers (Aquifer I)

SN	Taluka	Village	Type	Y	X	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe
1	Akkalkoat	Bisnger	DW	17.426	76.338	8	766	490	180	54	10.7	126	0.3	2.4	257.5	74	26	0	0.9	0.2
2	Akkalkoat	Bisnger	DW	17.426	76.338	8.3	1759	1126	524	51	96.2	45	2.4	0	224.5	320	41	0	0.6	0.2
3	Akkalkot	Borgaon	DW	17.65	76.313	8.1	832	532	304	96	15.6	66	3	0	317.2	130	41	0	0.6	0.4
4	Akkalkot	Chapalgaon	DW	17.608	76.175	8	782	500	220	80	4.9	88	1.3	2	217.9	112	45	0	0.4	0.1
5	Akkalkot	Gogaon	DW	17.619	76.393	8	649	415	240	82	8.7	53	0.7	2.7	285.3	74	45	0	0.8	0.1
6	Akkalkot	Jeur	DW	17.481	76.103	7.9	655	419	300	56	38.9	29	0.6	1.6	218.3	76	44	0	0.9	0.2
7	Akkalkot	Udgi	DW	17.433	76.225	8.8	412	264	152	26	21.4	25	1.3	8	135.6	24	11	0	0.7	0.2
8	Akkalkot	Udgi	DW	17.433	76.225	7.7	766	490	380	112	24.3	22	0.5	1.1	238.9	90	86	0	0.5	0.2
9	Akkalkot	Wagdari	DW	17.613	76.358	9.2	435	278	40	8	4.9	80	0.4	16.5	110.7	100	3	0	0.9	0.2
10	Barshi	Chikarde	DW	18.208	75.336	8.3	676	433	212	40	27.2	73	0.5	2.4	125.5	94	66	0	0.7	0.2
11	Barshi	Chikarde	DW	18.208	75.336	8.1	1550	922	184	43	18.5	76	0.5	0	219.6	152	45	0	0.9	0.2
12	Barshi	Gaudgaon	DW	18.063	75.972	8.2	797	510	332	66	40.8	24.5	1	0	146.4	124	62	0	0.8	0.3
13	Barshi	Kalaruwada	DW	18.375	75.754	8.4	955	611	332	58	45.7	71	2.5	0	195.2	162	72	0	0.9	0.2
14	Barshi	Malvandi	DW	18.058	75.656	8.5	1635	1046	340	77	36	76	6.3	0	102.5	246	19	0	0.7	0.3
15	Barshi	Manegaon	DW	18.078	75.788	0	1572	844	550	120	60.8	112.5	35.51	0	183	230.43	45	301	0.4	0
16	Barshi	Nari	DW	18.196	75.888	0	1281	584	475	132	35.2	47.9	2.07	0	256.2	170.16	19	154	0.4	0
17	Barshi	Pangaon	DW	18.138	75.737	8.2	1765	1130	600	104	82.6	102	9.8	0	185.4	300	140	0	0.8	0.5
18	Barshi	Pangri	DW	18.3	75.867	0	543	287	160	44	12.2	62.1	78.45	0	555.1	67.355	10	45	0.4	0
19	Barshi	Raleras	DW	18.006	75.814	8.3	1117	715	104	32	5.8	123	4.1	0	146.4	92	37	0	0.7	0.2
20	Barshi	Raleras	DW	18.006	75.814	7.5	2570	1645	740	176	72.9	359	1.4	0	283	270	1260	0	0.5	0.1
21	Barshi	Shelgaon	DW	17.967	75.833	0	596	270	185	54	12.2	54.7	1.09	12	244	63.81	13	17	0.5	0
22	Barshi	Shendri	DW	18.176	75.558	8.4	1100	704	416	70	58.6	107	0.9	3.6	305	246	38	0	0.3	0.2
23	Karmala	Bitargaon (wangi)	DW	18.14	75.125	8.2	968		378.5	269	26.6	41.9	2.5	0	102.5	231.3	91	38	0.3	0
24	Karmala	Deolali	DW	18.366	75.17	7.9	1679		597.6	274	78.7	89.8	2.6	0	551.4	46.3	79	92	0.5	0
25	Karmala	Hivare	DW	18.349	75.322	7.7	1465		542.8	344	48.4	50.2	1.4	0	336.7	120.8	93	72	0.5	0
26	Karmala	Kandar	DW	18.133	75.2	0	1157	613	410	108	34	107.1	23.16	0	347.7	145.35	28	324	0.5	0

27	Karmala	Karanje	DW	18.406	75.259	8.1	556		224.1	120	25.4	27.3	3.7	0	175.7	51.4	20	9	0.3	0
28	Karmala	Kedgaon	DW	18.272	75.078	7.8	1045		418.3	254	39.9	31.9	0.9	0	297.7	107.9	32	72	0.3	0
29	Karmala	Kem	DW	18.168	75.265	7.9	860		214.1	120	23	84.4	1.1	0	178.1	100.2	58	25	0.6	0
30	Karmala	Khadaki	DW	18.522	75.207	7.7	826		308.8	194	27.8	35.7	1.1	0	285.5	54	46	31	0.3	0
31	Karmala	Kondhar Chincholi	DW	18.284	74.816	7.4	3575		841.6	478	88.3	317	20	0	375.8	429.2	740	90	0.3	0
32	Karmala	Kondhej	DW	18.274	75.198	8.4	790		209.2	95	27.8	80	1.1	28.8	109.8	90	46	39	0.9	0
33	Karmala	Kugaon	DW	18.218	75.034	7.9	972		303.8	169	32.7	63.4	0.8	0	163.5	95.1	96	34	0.2	0
34	Karmala	Nerle	DW	18.281	75.362	7.8	1318		393.4	234	38.7	73.4	5.8	0	175.7	195.3	87	70	0.6	0
35	Karmala	Pangare	DW	18.186	75.179	8.1	2040		308.8	125	44.8	308.1	1.3	0	283	233.9	220	30	1.4	0
36	Karmala	Parewadi	DW	18.302	74.964	7.1	1861		612.5	398	52	58.7	1.8	0	224.5	259.6	120	90	0.5	0
37	Karmala	Pathurdi	DW	18.218	75.299	8	887		234.1	139	23	63.3	0.9	0	141.5	105.4	63	64	0.6	0
38	Karmala	Pondhvadi	DW	18.36	75.045	8	561		184.3	139	10.9	33.5	1.3	0	185.4	43.7	22	29	0.5	0
39	Karmala	Potegaon	DW	18.475	75.28	7.7	3954		1489	513	237.2	139.5	1.4	0	165.9	521.7	700	3	0.5	0
40	Karmala	Sade	DW	18.288	75.269	7.8	824		283.9	130	37.5	33.1	1.1	0	231.8	74.5	34	48	0.5	0
41	Karmala	Sogaon	DW	18.287	75.038	7.8	1615		597.6	413	44.8	45.5	1.3	0	119.6	197.9	250	80	0.3	0
42	Karmala	Takali (rashin)	DW	18.261	74.865	8.1	674		194.2	105	21.8	42.3	3.2	0	144	69.4	92	5	0.2	0
43	Karmala	Varkute	DW	18.25	75.333	0	687	365	230	56	21.9	89.3	17.4	0	183	113.44	31	73	0.4	0
44	Madha	Akulgaon	DW	18.132	75.45	8.2	1680		552.8	384	41.1	52.3	1.8	0	292.8	218.5	140	90	0.4	0
45	Madha	Anjangaon(kh)	DW	17.96	75.563	7.8	1872		378.5	219	38.7	150.9	2.3	0	119.6	336.7	190	100	0.8	0
46	Madha	Badalewadi	DW	18.098	75.29	7.8	1012		383.5	209	42.4	31.8	0.9	0	178.1	128.5	108	50	0.4	0
47	Madha	Bhosre	DW	18.081	75.434	0	3478	1848	1420	313	155.5	192	4.65	0	451.4	765.72	52	388	0.5	0
48	Madha	Dhanore	DW	18.002	75.686	8.1	1832		582.7	159	102.9	76.4	33	0	300.1	208.2	280	10	0.3	0
49	Madha	Gar Akole	DW	17.968	75.037	7.8	2244		542.8	229	76.2	176.7	1.2	0	236.7	293	400	50	0.8	0
50	Madha	Ghoti	DW	17.93	75.225	7.7	2209		737	403	81.1	62.2	2.4	0	136.6	429.2	170	90	0.3	0
51	Madha	Jakhale	DW	18.167	75.328	7.8	2371		582.7	189	95.6	128.8	70.1	0	295.2	347	290	50	0.5	0
52	Madha	Laul	DW	18.035	75.394	8.1	4714		1015.9	329	167	442.3	6.5	0	229.4	1056.3	460	60	0.6	0
53	Madha	Malegaon	DW	17.983	75.176	8.1	1001		323.7	189	32.7	53.4	2.6	0	148.8	125.9	146	16	0.2	0
54	Madha	Manegaon	DW	18.01	75.609	7.8	1501		224.1	209	3.6	117.3	1.9	0	104.9	177.3	94	100	0.2	0
55	Madha	Modnimb	DW	17.944	75.398	8.2	1452		438.2	249	46	60	2.2	0	241.6	236.5	110	10	0.4	0

56	Madha	Ridhore	DW	18.128	75.541	7.8	3976		1723.1	926	193.6	130.6	2	0	217.2	424.1	1180	10	0.3	0
57	Madha	Shiral Tembhorni	DW	18.077	75.167	7.7	1686		527.9	359	41.1	55.9	1.7	0	161	257	240	62	0.2	0
58	Madha	Wadachiwadi	DW	18.078	75.622	8	500		129.5	90	9.7	46.3	0.7	0	180.6	20.6	21	21	0.3	0
59	Madha	Wadshinge	DW	18.07	75.513	7.7	2484		861.5	448	100.4	65	2.2	0	141.5	454.9	350	120	0.4	0
60	Madha	Warawade	DW	17.979	75.302	7.5	949		273.9	164	26.6	44	2	0	266	84.8	42	34	0.4	0
61	Malshiras	Akluj	DW	17.866	75.174	9	756	484	128	29	13.6	62	0.2	12.7	134.8	44	29	0	0.3	0.3
62	Malshiras	Dharmपुरी	DW	17.939	74.675	8.2	1056	676	168	67	0	62	0.2	7.2	190.3	104	23	0	0.2	0.2
63	Malshiras	Dharmपुरी	DW	17.933	74.683	0	1357	720	555	128	57.1	44.4	17.33	12	189.1	141.8	41	15	0.6	0
64	Malshiras	Natepute	DW	17.897	74.756	9	510	326	176	46	14.6	79	0.1	13	138.5	120	8	0	0.7	0.2
65	Malshiras	Tarangfal	DW	17.778	74.925	8.8	1050	672	248	51	29.2	3.9	0.1	6	178.1	84	27	0	0.8	0.2
66	Malshiras	Bhamb	DW	17.796	74.792	7.8	1681		642.42	294	84.7	82	0.2	0	209.8	277.57	244	33	0.3	0
67	Malshiras	Chaundeshwarwadi	DW	17.857	75.036	8	1361		562.74	314	60.5	45.8	0.11	0	248.9	200.47	161	32	0.3	0
68	Malshiras	Dasur	DW	17.776	75.137	7.9	2303		677.28	219	111.3	202.4	0.23	0	351.4	346.97	352	20	0.3	0
69	Malshiras	Deshmukhwadi	DW	18.002	74.691	8.1	3165		493.02	134	87.1	499	0.1	0	658.8	341.83	506	33	0.9	0
70	Malshiras	Fadtari	DW	17.834	74.712	8.1	862		234.06	75	38.7	89.9	0.04	0	380.6	53.973	45	27	0.5	0
71	Malshiras	Fondshiras	DW	17.921	74.813	7.9	878		273.9	139	32.7	71.7	0.04	0	209.8	136.22	57	32	0.7	0
72	Malshiras	Girzani	DW	17.862	74.98	7.8	1227		353.58	134	53.2	117.2	2.1	0	248.9	77.104	249	31	0.5	0
73	Malshiras	Jambud	DW	17.847	75.146	7.8	2161		597.6	115	117.4	209.4	0.32	0	507.5	316.13	186	33	0.3	0
74	Malshiras	Kanher	DW	17.812	74.843	7.9	2829		776.88	194	141.6	291	0.06	0	322.1	508.89	400	32	0.4	0
75	Malshiras	Khudus	DW	17.831	74.96	8.1	2385		742.02	194	133.1	199	0.25	0	395.3	344.4	352	15	0.3	0
76	Malshiras	Maloli	DW	17.748	75.047	7.8	1495		373.5	209	39.9	168	0.05	0	234.2	187.62	239	33	0.5	0
77	Malshiras	Mandve	DW	17.88	74.808	8	1512		423.3	125	72.6	159	0.06	0	273.3	208.18	223	32	0.5	0
78	Malshiras	Nimgaon	DW	17.778	74.989	8.4	602		189.24	144	10.9	50	0.06	19.2	83	92.525	71	7	1.5	0
79	Malshiras	Palasmandal	DW	17.979	74.826	8.1	3788		991.02	488	122.2	399	3.94	0	273.3	691.36	632	12	0.5	0
80	Malshiras	Sangam	DW	17.94	75.135	7.7	1781		717.12	393	78.7	73	0.23	0	170.8	254.44	343	30	0.5	0
81	Malshiras	Shingorni	DW	17.63	75.009	7.9	896		278.88	129	36.3	77	0.8	0	258.6	110.52	62	21	0.4	0
82	Malshiras	Tambave	DW	17.905	75.092	8	1042		273.9	174	24.2	106	0.2	0	161	164.49	118	29	0.3	0
83	Malshiras	Tarangfal	DW	17.756	74.913	8.1	492		199.2	125	18.2	25	0.03	0	214.7	35.982	13	8	0.2	0
84	Malshiras	Tirwandi	DW	17.916	74.898	7.8	1410		502.98	354	36.3	85	0.19	0	122	246.73	204	29	0.3	0

85	Malshiras	Ughdewadi	DW	17.803	75.097	8.1	1967		637.44	229	99.2	165	0.38	0	307.4	287.85	309	23	0.3	0
86	Mangalvedhe	Marwade	DW	17.431	75.514	0	873	461	285	62	31.6	112.8	31.95	0	250.1	116.99	10	172	0.5	0
87	Mohal	Adhegaon	DW	17.735	75.558	7.2	1544	988	588	216	11.7	151	2.1	0	170.8	190	542	0	0.8	0.2
88	Mohal	Ichgaon	DW	17.601	75.604	8.9	572	366	52	19	1	136	0.9	11.6	156	70	26	0	1.5	0.2
89	Mohal	Kamthi kh.	DW	17.567	75.189	7.9	1224	783	324	96	20.4	169	0.8	0	214.7	202	400	0	1	0.2
90	Mohal	Pokharapur	DW	17.8	75.596	8.7	786	503	196	51	16.5	40	15	0	219.6	90	74	0	0.7	0.7
91	Mohal	Yawali	DW	17.84	75.596	8.8	355	227	168	64	1.9	28	1	10.1	169.6	20	7	0	0.2	0.2
92	Mohol	Angar	DW	17.895	75.575	0	891	471	350	74	40.1	97.7	3.25	0	244	152.44	50	223	0.5	0
93	Mohol	Ashti	DW	17.863	75.408	8.3	2046		463.1	144	77.4	129.7	9.9	28.8	73.2	336.7	260	80	0.5	0
94	Mohol	Bhambewadi	DW	17.841	75.7	7.9	966		358.6	204	37.5	28.9	7.8	0	158.6	143.9	62	32	0.3	0
95	Mohol	Dadapur	DW	17.709	75.739	7.8	1111		413.3	194	53.2	44.7	7.5	0	251.3	123.4	94	19	0.2	0
96	Mohol	Degaon	DW	17.668	75.861	7.9	1122		378.5	164	52	56.9	0.9	0	19.5	110.5	72	440	0.8	0
97	Mohol	Hivare	DW	17.894	75.527	8.1	1136		358.6	174	44.8	67.9	1.3	0	195.2	177.3	80	110	0.4	0
98	Mohol	Hivre	DW	17.842	75.538	0	561	256	230	48	26.7	45.2	1.56	0	250.1	49.63	12	1	0.4	0
99	Mohol	Ichgaon	DW	17.6	75.6	0	991	452	250	34	40.1	114.9	22.48	0	183	141.8	11	184	0.5	0
100	Mohol	Mohol	DW	17.81	75.645	0	1903	866	745	90	126.4	155	19.91	0	195.2	262.33	57	350	0.5	0
101	Mohol	Mohol	DW	17.84	75.638	8.1	1740		348.6	139	50.8	171.5	1	0	256.2	233.9	220	20	0.6	0
102	Mohol	Sayyadwarwade	DW	17.734	75.64	7.8	2821		811.7	324	118.6	195	47	0	273.3	665.7	280	70	0.2	0
103	Mohol	Sohale	DW	17.662	75.646	7.7	2242		697.2	413	69	95.7	1.2	0	161	367.5	360	30	0.2	0
104	Mohol	Sohole	DW	17.617	75.633	0	2146	973	900	232	77.8	83.4	1.34	0	219.6	187.89	57	651	0.5	0
105	Mohol	Watwate	DW	17.597	75.701	7.7	1412		493	354	33.9	26	1.4	0	178.1	192.8	152	28	0.2	0
106	Mohol	Wirwade Kh	DW	17.752	75.756	7.9	1983		288.8	154	32.7	251	2	0	236.7	290.4	200	10	0.6	0
107	Mohol	Yeoti	DW	17.82	75.464	7.9	882		318.7	234	20.6	30.8	12	0	170.8	123.4	62	46	0.3	0
108	Pandharpur	Adhiv	DW	17.763	75.377	7.7	1521		483.1	334	36.3	47.5	1.5	0	144	239	144	38	0.2	0
109	Pandharpur	Bhandi-Shegaon	DW	17.717	75.217	0	1988	907	675	146	75.3	99.4	16.6	0	274.5	248.15	46	413	0.4	0
110	Pandharpur	Bhose	DW	17.831	75.3	7.9	1158		343.6	199	35.1	67.7	1.2	0	161	128.5	114	69	0.3	0
111	Pandharpur	Dhondewadi	DW	17.728	75.167	7.9	1894		552.8	149	98	82.7	0.8	0	214.7	318.7	180	20	0.6	0
112	Pandharpur	Hole	DW	17.78	75.294	7.8	3578		881.5	259	151.3	203.7	1.9	0	209.8	431.8	730	40	0.3	0
113	Pandharpur	Ite	DW	17.687	75.506	8.3	1947		318.7	135	44.8	241.2	3.1	28.8	192.8	143.9	410	9	0.5	0

114	Pandharpur	Karole	DW	17.887	75.151	7.8	3744		597.6	179	101.7	374	1.4	0	348.9	331.5	770	87	0.8	0
115	Pandharpur	Korty	DW	17.642	75.273	8.3	1113		268.9	110	38.7	84.6	1	28.8	168.4	128.5	93	23	0.4	0
116	Pandharpur	Narayan Chincholi	DW	17.733	75.433	0	1333	605	505	78	75.3	89.7	2.33	0	353.8	148.89	19	257	0.5	0
117	Pandharpur	Palshi	DW	17.654	75.199	7.7	1519		433.3	324	26.6	42.4	1	0	163.5	205.6	112	68	0.3	0
118	Pandharpur	Patvardhan Kuroli	DW	17.808	75.217	8.2	2557		259	125	32.7	387.4	3.8	0	388	254.4	380	36	0.7	0
119	Pandharpur	Ranzani	DW	17.617	75.4	0	5867	3116	2220	409	291.6	184	52.78	0	329.4	1208.9	64	879	0.3	0
120	Pandharpur	Rople	DW	17.783	75.4	0	1986	903	875	168	110.6	110.4	17.08	0	311.1	262.33	49	526	0.4	0
121	Pandharpur	Siddhewadi	DW	17.59	75.433	7.7	2788		961.1	717	59.3	155.2	0.9	0	158.6	431.8	470	17	0.4	0
122	Pandharpur	Tanali	DW	17.572	75.337	7.8	2570		901.4	423	116.2	133.3	1.2	0	197.6	321.3	510	60	0.5	0
123	Sangole	Hangirge	DW	17.239	75.294	6.3	1690	1081	632	229	14.6	105	1.4	0	68.3	414	300	0	0.7	0.7
124	Sangole	Junoni	DW	17.255	74.991	8.9	861	551	288	59	34	108	25	0	322.1	144	67	0	0.9	0.2
125	Sangole	Tipehalli	DW	17.217	74.964	8.6	522	334	168	58	5.8	36	1	4.6	123.2	44	86	0	0.6	0.6
126	Sangole	Ajnale (ligadewadi)	DW	17.425	75.071	8	1588	1016	552	158	37.9	62	0.9	0	195.2	266	280	0	0.9	0.4
127	Sangole	Bamni	DW	17.481	75.239	8.8	2760	1766	940	312	38.9	112	0.9	0	107.4	416	694	0	0.8	0.3
128	Sangole	Wakshivane	DW	18.342	75.258	7.7	3820	2445	1140	318	83.6	104	0.6	0	248.9	820	190	0	0.9	0.5
129	Sangole	Sangola	DW	17.45	75.2	0	812	369	245	68	18.2	91.6	1.17	0	262.3	92.17	12	133	0.6	0
130	Solapur North	Akole kathi	DW	17.796	75.839	8.7	361	231	144	29	17.5	16	3.3	4.8	102.9	40	47	0	0.3	0.1
131	Solapur North	Akole kathi	DW	17.796	75.839	7.7	10000	6400	480	176	9.7	227	20.1	0	439.2	310	185	0	0.5	0.2
132	Solapur North	Balhe	DW	17.696	75.046	8.5	1944	1244	440	77	60.3	187	10.2	2.4	336.7	196	185	0	0.5	0.3
133	Solapur North	Degaon	DW	17.667	75.861	8.5	4830	3091	808	133	115.7	660	3.7	2.4	527	888	264	0	0.3	0.1
134	Solapur North	Dongaon	DW	17.606	75.826	8.4	2960	1894	728	109	110.8	170	2.2	1.2	104.9	676	152	0	0.7	0.3
135	Solapur North	Kalman	DW	17.931	75.783	8	820	525	272	64	27.2	75.2	2.5	4.8	180.6	220	13	0	0.1	0.1
136	Solapur North	Kalman	DW	17.931	75.783	8.2	966	618	284	22	55.4	18	1.2	0	81.7	198	98	0	0.1	0.1
137	Solapur North	Mardi	DW	17.803	75.9	8.3	924	791	296	45	44.7	48.2	1.5	0	302.6	116	82	0	0.3	0.4
138	Solapur North	Mardi	DW	17.803	75.9	7.6	1059	678	400	128	19.4	90	2.4	0	361.1	144	150	0	1	0.2
139	Solapur North	Tire Lamtanda	DW	17.508	75.679	8.4	432	276	216	46	24.3	17	15.4	5	210.9	36	23	0	0.9	0.2
140	Solapur North	Vadala	DW	17.876	75.831	7.8	546	349	232	83	5.8	92	0.6	1.2	194.8	84	34	0	0.5	0.1
141	Solapur North	Vadala	DW	17.876	75.831	8.4	1986	1271	408	67	58.3	170	9.7	3.6	85.4	300	140	0	0.4	0.2
142	Solapur North	Nannaj	DW	17.835	75.851	0	964	510	355	78	38.9	63	12.5	0	250.1	148.89	53	98	0.5	0

143	Solapur North	Soregaon	DW	17.592	75.883	0	2089	1104	950	160	133.7	88.1	16.38	0	201.3	382.86	10	579	0.5	0
144	Solapur South	Bhandar Kavathe	DW	17.414	75.711	7.9	760		199.2	80	29	39.7	2.6	0	126.9	84.8	112	7	0.2	0
145	Solapur South	Chincholi	DW	17.6	76.05	0	1014	463	355	82	36.5	80.4	13.19	0	378.2	127.62	44	113	0.5	0
146	Solapur South	Darganhalli	DW	17.686	76.033	8.1	1088		403.4	304	24.2	17.2	1.9	0	280.6	97.7	49	80	0.3	0
147	Solapur South	Gangewadi	DW	17.832	75.986	7.9	943		358.6	224	32.7	23.3	0.7	0	139.1	97.7	134	20	0.3	0
148	Solapur South	Hatur	DW	17.553	75.935	7.7	7494		2589.6	528	501	463	1.7	0	331.8	1549.8	1160	127	0.3	0
149	Solapur South	Hipale	DW	17.557	76.041	8.1	1390		592.6	184	99.2	25.6	3.1	0	339.2	143.9	124	12	0.7	0
150	Solapur South	Hotgi	DW	17.601	75.992	7.9	715		259	174	20.6	18.6	1	0	192.8	48.8	35	46	0.3	0
151	Solapur South	Kanbas	DW	17.47	76.054	7.8	2231		707.2	244	112.5	90	1.4	0	148.8	300.7	170	338	0.3	0
152	Solapur South	Kandehalli	DW	17.644	76.045	7.9	1616		577.7	299	67.8	49.6	10	0	353.8	151.6	250	10	0.3	0
153	Solapur South	Kurghot	DW	17.458	75.853	7.8	6131		1504	249	305	398	1.8	0	434.3	732.5	1220	20	0.2	0
154	Solapur South	Mulegaon	DW	17.688	75.973	7.7	1997		906.4	279	152.5	59.8	11.1	0	312.3	208.2	360	48	0.3	0
155	Solapur South	Musti	DW	17.735	76.127	8.3	1449		428.3	120	75	95.2	1.5	43.2	248.9	113.1	230	27	0.3	0
156	Solapur South	Nandni	DW	17.457	75.853	0	1601	732	570	128	60.8	100.1	1.86	0	164.7	209.16	11	326	0.4	0
157	Solapur South	Sadepur	DW	17.413	75.792	7.6	3017		1180.3	901	67.8	6.7	2.5	0	122	462.6	550	35	0.1	0
158	Solapur South	Telgaon Mandrup	DW	17.471	75.706	8.1	5825		677.3	70	147.6	796.7	0.9	0	595.4	629.7	880	63	0.5	0
159	Solapur South	Ule	DW	17.783	75.95	0	2078	393	835	144	115.4	75.5	2.69	0	207.4	180.8	22	587	1.2	0
160	Solapur South	Aurad	DW	17.474	75.907	8.2	525	336	144	34	14.6	45	0.3	3	200.9	86	51	0	0.5	0.2
161	Solapur South	Dindur	DW	17.618	76.092	8	828	530	326	120	6.3	65	22.6	0	205	118	155	0	1	0.1
162	Solapur South	Kandalgaon	DW	17.542	75.758	7.8	2360	1510	416	141	15.6	227	0.7	0	307.4	382	265	0	0.9	0.1
163	Solapur South	Mandrup	DW	17.492	75.825	8.3	633	405	208	50	20.4	120	0.5	1.7	90.2	76	31	0	0.7	0.3
164	Solapur South	Mushti	DW	17.726	76.091	8.2	298	191	60	8	9.7	56	0.2	1.2	82.7	70	25	0	1.2	0.1
165	Solapur South	Vinchur	DW	17.51	75.508	8.1	845	541	308	114	5.8	39	0.9	0	161	124	53	0	0.7	3.3
166	Solapur South	Yelegaon	DW	17.52	75.795	8.1	2270	1453	556	136	52.5	168	0.9	0	478.2	364	189	0	0.7	0.1

Annexure-V: Chemical analysis of ground water samples, deeper aquifers (Aquifer II)

SN	Taluka	Village	Type	Y	X	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe
1	Akkalkot	Alagi	BW	17.339	75.917	8.3	2910	1862	632	74	109	147	3.3	0	210	420	43	0	0.4	0.1
2	Akkalkot	Barhanpur	EW	17.638	76.179	7.6	970	574	250	76	15	112	11	0	281	103	68	51	0.5	0
3	Akkalkot	Wagdari	EW	17.613	76.358	7.5	1120	640	460	142	26	44	1.2	0	220	160	120	37	0.22	0
4	Akkalkot	Nagansur	EW	17.391	76.155	7.8	1680	1087	195	7	2	295	2	0	85	184	462	21	4.8	0
5	Akkalkot	Akkalkot	EW	17.521	76.208	8.1	1450	928	155	52	6	241	30	0	92	184	361	2	5.6	0
6	Barshi	Kale Shelgaon	EW	18.288	75.683	8.1	550	305	210	52	19	32	0.8	0	281	14	29		0.51	0
7	Barshi	Chalara	EW	18.371	75.803	7.8	760	420	285	64	30	46	0.1	0	397	27	22		0.64	0
8	Barshi	Nanaini	EW	18.11	75.843	8.7	485	306	80	16	10	94	1.2	12	85	50	121			0
9	Barshi	Shelgone (E)	EW	17.95	75.817	8.4	1000	375	55	16	4	115	0.8	18	18	121	87		3.45	0
10	Barshi	Mahagaon	EW	18.188	75.8	7.6	1930	1253	270	94	9	342	2	0	189	170	524	20	1.4	0
11	Barshi	Gaudgaon	EW	18.067	75.971	8.4	500	320	40	12	24	98	1.5	18	73	60	55	10	1.15	0
12	Barshi	Bhalgaon	BW	18.039	75.952	8.4	980	627	272	48	37	124	1.5	0	366	86	100	0	0.8	0.2
13	Barshi	Chalara	EW	18.371	75.803	7.8	760	420	285	64	30	46	0	0	397	27	22	0	0.64	0
14	Barshi	Kale Shelgaon	EW	18.288	75.683	8.1	550	305	210	52	20	32	0.78	0	281	14	29	0	0.51	0
15	Barshi	Nandini	EW	18.11	75.843	8.7	485	306	80	16	10	94	1.17	12	85	50	121	0	0	0
16	Barshi	Torewadi	EW	17.75	76.075	9.2	550	305	45	10	5	94	1.96	24	12	89	74	0	0	0
17	Kalamb	Munaewadi (E)	EW	17.516	75.537	7.4	700	375	190	44	19	71	1.6	0	265	50	57		0.86	0
18	Kalamb	Mundewadi (E)	EW	17.676	75.397	7.4	375	375	190	44	20	71	1.56	0	265	50	57	0	0.86	0
19	Karmala	Hiwarewadi	EW	18.423	75.18	7.6	1030	715	130	22	2	76	0.3	0	11	67	22	8	4.2	0
20	Karmala	Zare	EW	18.324	75.141	7.3	750	408	245	58	24	47	0.9	0	323	42	20	54	0.83	0
21	Karmala	Zare	EW	18.324	75.141	7.3	750	408	245	58	24	47	0.9	0	323	42	20	54	0.83	0
22	Kavathe Mahankal	Nagaj	EW	17.45	76.323	7.7	800	512						0	145					0
23	Kavathe	Nagaj	EW	17.158	75.284	7.65	800	800	0	0	0	0	0	0	145	0	0	0	0	0

SN	Taluka	Village	Type	Y	X	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe
	Mahankal																			
24	Madha	Wadsinghe	EW	18.09	75.516	7.9	730	410	260	72	19	44	0.4	0	354	43	5		0.72	0
25	Madha	Anjangaon	EW	17.936	75.547	7.1	750	444	65	12	9	142	10	0	146	117	51	21	10.9	0
26	Madha	Madha	EW	18.033	75.521	6.9	830	508	180	48	15	108	1.5	0	122	128	87	55	4.21	0
27	Madha	Madha	EW	18.033	75.521	6.5	900	555	155	50	7	133	3	0	122	156	68	74	3.57	0
28	Madha	Madha	EW	18.033	75.521	6.9	750	460	75	20	6	136	3	0	140	99	100	20	6.87	0
29	Madha	Vairag	EW	18.025	75.513	7.2	1570	1010	140	54	1	295	0.9	0	146	174	404	5	6.4	0
30	Madha	Temburni	EW	18.025	75.192	7.5	1650	963	610	170	45	92	0.1	0	305	227	118	160	2.04	0
31	Madha	Parite Village	BW	17.942	75.283	9.5	420	200	25	6	2	79	4.5	24	49	67		4	12	0
32	Madha	Parite Village	DW	17.942	75.283	7.3	1380	739	590	120	71	41	5.4	0	378	170	34	108	0.76	0
33	Madha	Parite	EW	17.942	75.283	8.2	590	354	65	20	40	103	0	0	116	89	55	15	11.2	0
34	Madha	Wadsinghe	EW	18.09	75.516	7.85	730	410	260	72	20	44	0.39	0	354	43	5	0	0.72	0
35	Malshiras	Malshiras	EW	17.858	74.908	7.2	640	325	280	72	24	17	0.1	0	354	21	5	9	0.37	0
36	Malshiras	Malshiras	EW	17.858	74.908	7.2	600	306	26	66	23	19	0.1	0	329	18	5	10	0.39	0
37	Malshiras	Malshiras	EW	17.858	74.908	7.2	640	322	280	64	29	19	0.2	0	342	25	3	10	0.37	0
38	Malshiras	Malshiras	EW	17.858	74.908	7.2	610	306	270	64	27	17	0.1	0	329	21	3	9	0.4	0
39	Malshiras	Malshiras	EW	17.858	74.908	7.2	600	308	265	68	23	17	0.1	0	329	21	5	9	0.37	0
40	Malshiras	Malshiras	EW	17.858	74.908	7.2	620	322	265	66	24	19	0.1	0	360	21	2	9	0.38	0
41	Malshiras	Malshiras	EW	17.858	74.908	7.2	620	322	270	66	25	18	0.1	0	354	25	2	9	0.4	0
42	Malshiras	Malshi	EW	17.858	74.908	7.2	620	322	270	66	25	18	0.1	0	354	25	2	9	0.4	0
43	Malshiras	Velapur	EW	17.787	75.064	7.6	850	468	315	78	29	49	0.4	0	311	67	13	76	0.88	0
44	Malshiras	Velapur	EW	17.787	75.064	7.1	1110	656	215	70	10	157	0.9	0	159	223	81	32	3.12	0
45	Malshiras	Velapur	EW	17.787	75.064	7.4	1240	740	175	64	4	204	0.9	0	79	305	111	11	3.94	0
46	Malshiras	Tamsidwadi	EW	17.889	74.822	7.9	808	429	224	39	30	93	0.9	0	268	87	66	25	0.58	0

SN	Taluka	Village	Type	Y	X	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe
47	Malshiras	Tamsidwadi	OW	17.889	74.822	7.8	835	442	235	61	19	92	0.9	0	280	89	66	25	0.6	0
48	Malshiras	Tamsidwadi	EW	17.889	74.822	7.9	836	443	230	37	33	93	1	0	244	116	65	24	0.59	0
49	Mangalvedhe	Nanaur	EW	17.442	75.592	7.9	2100	1385	210	76	5	400	6	0	104	291	514	38	5.4	0
50	Mangalvedhe	Marwade Village	BW	17.45	75.5	7.9	600	325	230	52	24	42	0.3	0	262	50		25	0.6	0
51	Mangalvedhe	Marwade	EW	17.45	75.5	7.3	710	442	65	20	4	130	1	0	92	99	120	18	4.7	0
52	Mangalvedhe	Nanaeshwar	EW	17.369	75.378	7.4	480	257	120	32	10	55	0.6	0	220	35	6	8	0.57	0
53	Mangalvedhe	Nanaeshwar	EW	17.369	75.378	7.5	500	270	105	22	12	65	0.9	0	214	46	9	7	1.25	0
54	Mangalvedhe	Nanaeshwar	EW	17.369	75.378	7.6	430	232	60	20	2	70	0.5	0	214	21	4	7	0.66	0
55	Mangalvedhe	Bhose	EW	17.308	75.375	7.8	1590	900	615	100	89	82	2	0	287	216	215	53	2.1	0
56	Mohol	Narkhed	OW	17.904	75.508	8.3	720	417	70	22	4	127	2.5	0	92	145	62	5	3.73	0
57	Mohol	Narkhed	EW	17.904	75.508	7.7	1120	708	95	32	4	209	1	0	55	170	257	7	0.81	0
58	Mohol	Mohol	EW	17.875	75.538	7.8	1750	1098	285	80	21	260	23	0	116	269	380	4	5.3	0
59	Mohol	Hivre	EW	17.875	75.538	7.2	950	560	85	20	9	179	9	0	110	213	71	2	3.84	0
60	Mohol	Solapur	EW	17.663	75.754	7.8	1640	994	280	90	13	242	16	0	201	280	230	23	1	0
61	Mohol	Shetphal	EW	17.9	75.429	8.6	690	402	50	16	2	125	1.5	12	110	124	46	15	5.5	0
62	Mohol	Mohol	BW	17.875	75.538	8.1	380	200	80	16	10	49	0.4	0	98	35	38	1	1.48	0
63	Mohol	Ankdi Mohol	HP	17.671	75.613	7.9	640	359	145	44	9	80	0.6	0	146	67	82	3	0.28	0
64	Mohol	Angar	BW	17.897	75.578	8.7	980	627	324	101	18	63	2.3	0	122	180	73	0	0.6	0.3
65	Mohol	Paremeshwar Pimpri	EW	17.667	75.696	7.1	450	260	200	54	16	21	1.96	0	238	14	31	0	0	0
66	Pandharpur	Mangewadi	EW	17.733	75.119	8	578	370	155	44	11	53	0.8	0	201	50	35			0
67	Pandharpur	Kardi	EW	17.577	75.269	8.2	1050	672	75	28	1	193	0.4	0	73	156	207			0
68	Pandharpur	Panaharpur	EW	17.683	75.316	7.4	940	594	360	44	61	129	1	0	177	135	125	9	1.15	0
69	Pandharpur	Panaharpur	EW	17.683	75.316	7.3	960	611	370	48	61	135	1	0	183	135	129	9	1.12	0
70	Pandharpur	Panaharpur	EW	17.683	75.316	7.8	730	475	260	20	51	124	1	0	110	128	93	2	1.73	0

SN	Taluka	Village	Type	Y	X	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe
71	Pandharpur	Panaarpur	EW	17.683	75.316	7.8	730	475	260	20	51	124	1	0	110	128	93	2	1.73	0
72	Pandharpur	Bhalwani	EW	17.672	75.125	6.8	1030	592	180	46	16	148	11.5	0	189	206	64	4	1.6	0
73	Pandharpur	Bhalwani	EW	17.672	75.125	7.4	830	460	125	18	19	133	2.5	0	73	220	24	6	1.6	0
74	Pandharpur	Kasegaon	HP	17.617	75.325	7.7	2000	1215	350	128	7	295	2	0	122	429	162	129	1.2	0
75	Pandharpur	Kasegaon	BW	17.617	75.325	7.7	1090	611	305	82	24	88	31	0	299	122	76	37	0.56	0
76	Pandharpur	Kardi	EW	17.577	75.269	8.2	1050	672	75	28	1	193	0.39	0	73	156	207	0	0	0
77	Pandharpur	Mangewadi	EW	17.733	75.119	8	578	370	155	44	11	53	0.78	0	201	50	35	0	0	0
78	Pandharpur	Panaharpur	EW	17.683	75.316	7.8	890	515	190	54	13	117	0.5	0	195	121	98	15	1.03	0
79	Sangola	Ekhatpur	EW	17.48	75.148	7.8	1111	711	235	56	23	152	0.8	0	317	174	59			0
80	Sangola	Chanaalwadi	EW	17.48	75.069	7.6	476	305	165	46	12	37	0.8	0	250	28	1			0
81	Sangola	Sangole	EW	17.45	75.2	8.6	830	531	83	27	4			6	140	138				0
82	Sangola	Kadlar	EW	17.365	75.193	7.5	609	390	210	52	19	51	1.2	0	275	57	16			0
83	Sangola	Kamlapur	EW	17.418	75.119	7.3	1080	720	410	60	63	153	2	0	116	160	191	29	3.28	0
84	Sangola	Anakdhal	EW	17.369	75.079	7.9	1260	806	200	76	2	212	0.78	0	229	117	296	0	0	0
85	Sangola	Chandalwadi	EW	17.48	75.069	7.6	476	305	165	46	12	37	0.78	0	250	28	1	0	0	0
86	Sangola	Ekhatpur	EW	17.48	75.148	7.8	1111	711	235	56	23	152	0.78	0	317	174	59	0	0	0
87	Sangola	Kadlar	EW	17.365	75.193	7.5	609	390	210	52	20	51	1.17	0	275	57	16	0	0	0
88	Sangola	Sangole	EW	17.45	75.2	8.6	830	531	82.5	27	4	0	0	6	140	138	0	0	0	0
89	Sangola	Wasud	EW	17.396	75.167	7.1	1689	1081	225	85	4	265	1.56	0	37	394	209	0	0	0
90	Solapur North	Ranmasal	EW	17.864	75.808	8	1100	610	110	36	5	184	0.8	0	110	220	107		1.7	0
91	Solapur North	Hensal	EW	17.825	75.947	7.9	1850	1200	145	58		354	1.6	0	37	227	548		2.58	0
92	Solapur North	Marde	EW	17.821	75.833	8.2	2730	1885	635	244	6	368	13.7	0	61	440	752		6.8	0
93	Solapur North	Solapur	EW	17.675	75.921	7.6	1350	766	485	122	44	85	10	0	281	135	190	42	1	0
94	Solapur North	Gunjegaon	BW	17.633	75.779	7.7	1920	1163	670	208	36	82	76	0	378	241	110	220	0.38	0

SN	Taluka	Village	Type	Y	X	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe
95	Solapur North	Gunjegaon	DW	17.633	75.779	7.6	1970	1180	710	132	92	83	83	0	220	333	154	192	0.51	0
96	Solapur North	Gungegaon	EW	17.633	75.779	7.6	1970	1180	710	132	92	83	83	0	220	333	154	192	0.51	0
97	Solapur North	Hensal	EW	17.825	75.947	7.85	1850	1200	145	58	0	354	1.56	0	37	227	548	0	2.58	0
98	Solapur North	Marde	EW	17.821	75.833	8.2	2730	1885	635	245	6	368	13.7	0	61	440	752	0	6.8	0
99	Solapur North	Ranmasal	EW	17.864	75.808	8.04	1100	610	110	36	5	184	0.78	0	110	220	107	0	1.7	0
100	Solapur South	Kumbhari	EW	17.649	75.991	8.4	590	350	195	52	16	54	2	18	171	46	77		0.24	0
101	Solapur South	Musti I	EW	17.725	76.117	7.1	1990	1274	240	80	10	328	0.6	0	61	248	548	28	1.25	0
102	Solapur South	Darganhalli	EW	17.688	76.029	8.1	550	305	80	10	14	89	0.4	0	104	92	40	2	5.59	0
103	Solapur South	Manarup	EW	17.563	76.042	7.4	2300	1396	350	124	10	316	2	0	110	390	490	6	2.81	0
104	Solapur South	Antroli	EW	17.55	75.7	7.8	1750	1042	480	112	49	169	1	0	195	248	317	45	3.12	0
105	Solapur South	Ankoli	EW	17.55	75.7	8	1500	920	205	52	18	241	4	0	55	298	267	11	9.7	0
106	Solapur South	Manarup	HP	17.563	76.042	7.9	1250	774	175	64	4	198	1	0	37	209	221	57	1.46	0
107	Solapur South	Antroli Village	HP	17.55	75.7	7.8	2800	1612	980	244	90	200	3	0	403	404	406	63	0.8	0
108	Solapur South	Kumbhari	EW	17.649	75.991	8.4	590	350	195	52	16	54	1.96	18	171	46	77	0	0.24	0

**Annexure-VI (A): Location (tentative) of proposed Artificial Recharge structures
(Percolation tanks)**

SN	Village	Taluka
1	Achegaon	Akkalkot
2	Akatnal	Akkalkot
3	Akkalkot	Akkalkot
4	Alage	Akkalkot
5	Andewadi Bk	Akkalkot
6	Andewadi Kh	Akkalkot
7	Andewadi(Jahangir)	Akkalkot
8	Ankalage	Akkalkot
9	Badole Bk	Akkalkot
10	Badole Bk	Akkalkot
11	Banjgol	Akkalkot
12	Basavgir	Akkalkot
13	Bavkarwadi	Akkalkot
14	Boblad	Akkalkot
15	Boblad	Akkalkot
16	Boregaon	Akkalkot
17	Borgaon	Akkalkot
18	Borgaon	Akkalkot
19	Borgaon	Akkalkot
20	Boroti Kh.	Akkalkot
21	Chapalgaonwadi	Akkalkot
22	Chincholi	Akkalkot
23	Chungi	Akkalkot
24	Dahitane	Akkalkot
25	Dahitane	Akkalkot
26	Devikavathe	Akkalkot
27	Devikavathe	Akkalkot
28	Devikavathe	Akkalkot
29	Dharsang	Akkalkot
30	Dudhani	Akkalkot
31	Dudhani	Akkalkot
32	Gholasgaon	Akkalkot
33	Goudgaon Kh	Akkalkot
34	Guddewadi	Akkalkot
35	Halhali(M)	Akkalkot
36	Handral	Akkalkot
37	Handral	Akkalkot
38	Handral	Akkalkot
39	Hanjagi	Akkalkot
40	Hanjagi	Akkalkot
41	Hannur	Akkalkot
42	Hannur	Akkalkot
43	Hannur	Akkalkot

SN	Village	Taluka
44	Hilli	Akkalkot
45	Ibrahimpur	Akkalkot
46	Itage	Akkalkot
47	Jakapur	Akkalkot
48	Jakapur	Akkalkot
49	Jeur	Akkalkot
50	Jeur	Akkalkot
51	Kajikanbas	Akkalkot
52	Kalegaon	Akkalkot
53	Kalhippara	Akkalkot
54	Karajagi	Akkalkot
55	Karajagi	Akkalkot
56	Khairat	Akkalkot
57	Khairat	Akkalkot
58	Khanapur	Akkalkot
59	Kini	Akkalkot
60	Kini	Akkalkot
61	Kini	Akkalkot
62	Korsegaon	Akkalkot
63	Kudal	Akkalkot
64	Kumthe	Akkalkot
65	Kurnur	Akkalkot
66	Kurnur	Akkalkot
67	Maindargi	Akkalkot
68	Maindargi	Akkalkot
69	Maindargi	Akkalkot
70	Mamdabad	Akkalkot
71	Mhaisalge	Akkalkot
72	Nagansur	Akkalkot
73	Nagansur	Akkalkot
74	Nagansur	Akkalkot
75	Nanhegaon	Akkalkot
76	Navindgi	Akkalkot
77	Nimgaon	Akkalkot
78	Parmanandnagar(NV133)	Akkalkot
79	Pitapur	Akkalkot
80	Rampur	Akkalkot
81	Ruddewadi	Akkalkot
82	Ruddewadi	Akkalkot
83	Ruddewadi	Akkalkot
84	Sangavi Bk	Akkalkot
85	Sangavi Kh	Akkalkot
86	Sangogi (b)	Akkalkot

SN	Village	Taluka
87	Sangogi Aland	Akkalkot
88	Satan Dudhani	Akkalkot
89	Satan Dudhani	Akkalkot
90	Shirasi	Akkalkot
91	Shirasi	Akkalkot
92	Shirasi	Akkalkot
93	Shirwal	Akkalkot
94	Shirwal	Akkalkot
95	Sindkhed	Akkalkot
96	Tolnur	Akkalkot
97	Torani	Akkalkot
98	Valsang	Akkalkot
99	Agalgaon	Barshi
100	Agalgaon	Barshi
101	Agalgaon	Barshi
102	Ambegaon	Barshi
103	Babhulgaon	Barshi
104	Barshi	Barshi
105	Barshi	Barshi
106	Barshi Urban	Barshi
107	Barshi Urban	Barshi
108	Barshi Urban	Barshi
109	Bhatambare	Barshi
110	Bhoenje	Barshi
111	Bhoenje	Barshi
112	Bhoenje	Barshi
113	Borgaon (K	Barshi
114	Chincholi	Barshi
115	Devgaon	Barshi
116	Devgaon	Barshi
117	Dhamgaon (Dumala)	Barshi
118	Dhamgaon (Dumala)	Barshi
119	Dhamgaon (Dumala)	Barshi
120	Dhorale	Barshi
121	Gaudgaon	Barshi
122	Gaudgaon	Barshi
123	Ghanegaon	Barshi
124	Ghanegaon	Barshi
125	Gormale	Barshi
126	Gulpoli	Barshi
127	Hattij	Barshi
128	Hattij	Barshi
129	Hattij	Barshi
130	Hingani(Ratanjan)	Barshi
131	Irle	Barshi
132	Irlewadi	Barshi
133	Irlewadi	Barshi

SN	Village	Taluka
134	Jamgaon (Agalgaon)	Barshi
135	Kalambodi(A)	Barshi
136	Kalegaon	Barshi
137	Kalegaon	Barshi
138	Kalegaon	Barshi
139	Kandalgaon	Barshi
140	Kari	Barshi
141	Kasari	Barshi
142	Kasarwadi	Barshi
143	Kasarwadi	Barshi
144	Kasarwadi	Barshi
145	Kavhe	Barshi
146	Kavhe	Barshi
147	Khadkoni	Barshi
148	Khamgaon	Barshi
149	Khandavi	Barshi
150	Koregaon	Barshi
151	Korfale	Barshi
152	Korfale	Barshi
153	Korfale	Barshi
154	Korfale	Barshi
155	Lakshychiwadi(N.V.)	Barshi
156	Mahagaon	Barshi
157	Malegaon	Barshi
158	Malwandi	Barshi
159	Mandegaon	Barshi
160	Mandegaon	Barshi
161	Mouje Tadwale	Barshi
162	Mouje Tadwale	Barshi
163	Mouje Tadwale	Barshi
164	Mouje Tadwale	Barshi
165	Mouje Tadwale	Barshi
166	Mungashi	Barshi
167	Mungashi	Barshi
168	Nandani	Barshi
169	Nari (Bhandewadi)	Barshi
170	Nariwadi (NV) (48)	Barshi
171	Pangaon	Barshi
172	Pangaon	Barshi
173	Pangaon	Barshi
174	Pangri	Barshi
175	Phaphalwadi	Barshi
176	Pimpalgaon	Barshi
177	Pimpalgaon	Barshi
178	Pimpalgaon	Barshi
179	Pimpalgaon	Barshi
180	Pimpari (Pangaon)	Barshi

SN	Village	Taluka
181	Puri	Barshi
182	Raleras	Barshi
183	Raulgaon	Barshi
184	Raulgaon	Barshi
185	Sakat	Barshi
186	Sakat	Barshi
187	Sasure	Barshi
188	Sasure	Barshi
189	Sasure	Barshi
190	Sasure	Barshi
191	Sawargaon	Barshi
192	Sawargaon	Barshi
193	Shelgaon (Markad)	Barshi
194	Shelgaon(R)	Barshi
195	Shendri	Barshi
196	Shendri	Barshi
197	Shirale	Barshi
198	Shripat Pimprir	Barshi
199	Shripat Pimprir	Barshi
200	Shripat Pimprir	Barshi
201	Shripat Pimprir	Barshi
202	Shripat Pimprir	Barshi
203	Surdi	Barshi
204	Tadsoudne	Barshi
205	Tandulwadi	Barshi
206	Tandulwadi	Barshi
207	Tandulwadi	Barshi
208	Turk Pimpa	Barshi
209	Ukadgaon	Barshi
210	Ukadgaon	Barshi
211	Umbarge	Barshi
212	Undegaon	Barshi
213	Undegaon	Barshi
214	Undegaon	Barshi
215	Upalai (Thonge)	Barshi
216	Upalai (Thonge)	Barshi
217	Upalai (Thonge)	Barshi
218	Upalai (Thonge)	Barshi
219	Vairag	Barshi
220	Yawali	Barshi
221	Yawali	Barshi
222	Yawali	Barshi
223	Yelamb	Barshi
224	Yelamb	Barshi
225	Zaregaon	Barshi
226	Aljapur	Karmala
227	Aljapur	Karmala

SN	Village	Taluka
228	Alsunde	Karmala
229	Anjandoh	Karmala
230	Anjandoh	Karmala
231	Anjandoh	Karmala
232	Anjandoh	Karmala
233	Arjunnagar	Karmala
234	Arjunnagar	Karmala
235	Awati	Karmala
236	Awati	Karmala
237	Awati	Karmala
238	Awati	Karmala
239	Balewadi	Karmala
240	Balewadi	Karmala
241	Bhalavni	Karmala
242	Bhalewadi	Karmala
243	Bhalewadi	Karmala
244	Bhalewadi	Karmala
245	Bhose	Karmala
246	Bitargaon(Shrigonde)	Karmala
247	Bitargaon(Shrigonde)	Karmala
248	Bitargaon(Shrigonde)	Karmala
249	Ghoti	Karmala
250	Gulsadi	Karmala
251	Gulsadi	Karmala
252	Hisare	Karmala
253	Hisare	Karmala
254	Hivare	Karmala
255	Hivare	Karmala
256	Hiwarwadi	Karmala
257	Jeur	Karmala
258	Jeur	Karmala
259	Kandar	Karmala
260	Karanje	Karmala
261	Kem	Karmala
262	Kem	Karmala
263	Kem	Karmala
264	Kem	Karmala
265	Kem	Karmala
266	Kem	Karmala
267	Kem	Karmala
268	Kem	Karmala
269	Kem	Karmala
270	Khadaki	Karmala
271	Khadaki	Karmala
272	Kolgaon	Karmala
273	Korti	Karmala
274	Korti	Karmala

SN	Village	Taluka
275	Kumbhej	Karmala
276	Kumbhej	Karmala
277	Kumbhej	Karmala
278	Kumbhej	Karmala
279	Kumbhej	Karmala
280	Malwadi	Karmala
281	Malwadi	Karmala
282	Mangi	Karmala
283	Mirgavhan	Karmala
284	Morwad	Karmala
285	Morwad	Karmala
286	Morwad	Karmala
287	Nerle	Karmala
288	Nerle	Karmala
289	Nerle	Karmala
290	Nerle	Karmala
291	Nerle	Karmala
292	Nerle	Karmala
293	Nerle	Karmala
294	Nimgaon (h)	Karmala
295	Nimgaon (h)	Karmala
296	Padali	Karmala
297	Pande	Karmala
298	Pande	Karmala
299	Pande	Karmala
300	Pathurdi	Karmala
301	Phisare	Karmala
302	Potegaon	Karmala
303	Pothare	Karmala
304	Pothare	Karmala
305	Pothare	Karmala
306	Punwar	Karmala
307	Sade	Karmala
308	Salse	Karmala
309	Salse	Karmala
310	Satoli	Karmala
311	Shelgaon (Wangi)	Karmala
312	Shelgaon (Wangi)	Karmala
313	Shelgaon (Wangi)	Karmala
314	Vadshivane	Karmala
315	Varkute	Karmala
316	Varkute	Karmala
317	Veet	Karmala
318	Veet	Karmala
319	Veet	Karmala
320	Veet	Karmala
321	Veet	Karmala

SN	Village	Taluka
322	Veet	Karmala
323	Vihal	Karmala
324	Vihal	Karmala
325	Vihal	Karmala
326	Wadgaon(n)	Karmala
327	Wadgaon(n)	Karmala
328	Zare	Karmala
329	Zare	Karmala
330	Zare	Karmala
331	Adegaon	Madha
332	Adegaon	Madha
333	Ahergaon	Madha
334	Akulgaon	Madha
335	Anjangaon (Kh)	Madha
336	Anjangaon (Kh)	Madha
337	Aran	Madha
338	Bairagwadi	Madha
339	Bembale	Madha
340	Bembale	Madha
341	Bhosare	Madha
342	Bitergaon	Madha
343	Bitergaon	Madha
344	Bitergaon	Madha
345	Budrukwadi	Madha
346	Chandaj	Madha
347	Chandaj	Madha
348	Chavhanwadi	Madha
349	Chobepimpari	Madha
350	Chobepimpari	Madha
351	Chobepimpari	Madha
352	Darfal	Madha
353	Darfal	Madha
354	Darfal	Madha
355	Darfal	Madha
356	Darfal	Madha
357	Darfal	Madha
358	Darfal	Madha
359	Dhanore	Madha
360	Dhanore	Madha
361	Dhavalas	Madha
362	Ghoti	Madha
363	Hatkarwadi	Madha
364	Hole Kh	Madha
365	Jadhavwadi	Madha
366	Jamgaon	Madha
367	Kewad	Madha
368	Kewad	Madha

SN	Village	Taluka
369	Kewad	Madha
370	Khairao	Madha
371	Khairao	Madha
372	Khairao	Madha
373	Khairewadi	Madha
374	Kumbhej	Madha
375	Kumbhej	Madha
376	Kurdu	Madha
377	Kurduwadi	Madha
378	Kurduwadi	Madha
379	Lahu	Madha
380	Lahu	Madha
381	Lahu	Madha
382	Lahu	Madha
383	Londhewadi	Madha
384	Madha	Madha
385	Madha	Madha
386	Madha	Madha
387	Madha	Madha
388	Mahadeowadi	Madha
389	Mahadeowadi	Madha
390	Mahadeowadi	Madha
391	Mahatpur	Madha
392	Malegaon	Madha
393	Malegaon	Madha
394	Manegaon	Madha
395	Manegaon	Madha
396	Manegaon	Madha
397	Mhaisgaon	Madha
398	Mhaisgaon	Madha
399	Mhaisgaon	Madha
400	Mhaisgaon	Madha
401	Mhaisgaon	Madha
402	Mungshi	Madha
403	Nadi	Madha
404	Nadi	Madha
405	Palwan	Madha
406	Panch Phulwadi	Madha
407	Papnas	Madha
408	Papnas	Madha
409	Papnas	Madha
410	Parite	Madha
411	Pimpalkhunte	Madha
412	Pimpalner	Madha
413	Pimpalner	Madha
414	Pimpalner	Madha
415	Ranzani	Madha

SN	Village	Taluka
416	Ranzani	Madha
417	Ranzani	Madha
418	Rople Kavhe	Madha
419	Rople Kavhe	Madha
420	Rople Kavhe	Madha
421	Sapatne Tembhurni	Madha
422	Shevare	Madha
423	Shingewdi	Madha
424	Shingewdi	Madha
425	Shingewdi	Madha
426	Solankarwadi	Madha
427	Tambave	Madha
428	Tambave	Madha
429	Tambave	Madha
430	Tandulwadi	Madha
431	Tandulwadi	Madha
432	Tandulwadi	Madha
433	Tandulwadi	Madha
434	Tembhurni	Madha
435	Tembhurni	Madha
436	Tembhurni	Madha
437	Ujani Madha	Madha
438	Undargaon	Madha
439	Undargaon	Madha
440	Undargaon	Madha
441	Upalai Bk	Madha
442	Upalai Bk	Madha
443	Upalai Kh	Madha
444	Upalai Kh	Madha
445	Upalai Kh	Madha
446	Venegaon	Madha
447	Venegaon	Madha
448	Venegaon	Madha
449	Venegaon	Madha
450	Vithalwadi	Madha
451	Wadoli	Madha
452	Wadshinge	Madha
453	Wadshinge	Madha
454	Wadshinge	Madha
455	Wadshinge	Madha
456	Wakav	Madha
457	Warawade	Madha
458	Anandnagar	Malshiras
459	Borgaon	Malshiras
460	Chandapuri	Malshiras
461	Dahigaon	Malshiras
462	Dombalwadi	Malshiras

SN	Village	Taluka
463	Ekshiv	Malshiras
464	Falvani	Malshiras
465	Fondsiras	Malshiras
466	Fondsiras	Malshiras
467	Girzani	Malshiras
468	Gursale	Malshiras
469	Gursale	Malshiras
470	Jambud	Malshiras
471	Kacharewadi	Malshiras
472	Kalamwadi	Malshiras
473	Khandali	Malshiras
474	Khawale	Malshiras
475	Kolegaon	Malshiras
476	Kondabavi	Malshiras
477	Kurbavi	Malshiras
478	Lawang	Malshiras
479	Mahalung	Malshiras
480	Malewadi	Malshiras
481	Malinagar	Malshiras
482	Maloli	Malshiras
483	Maloli	Malshiras
484	Markadwadi	Malshiras
485	Markadwadi	Malshiras
486	Medad	Malshiras
487	Mire	Malshiras
488	Neware	Malshiras
489	Nimgaon	Malshiras
490	Piliv	Malshiras
491	Piliv	Malshiras
492	Pirale	Malshiras
493	Pirale	Malshiras
494	Purandawade	Malshiras
495	Salmukhwadi	Malshiras
496	Shendeinch	Malshiras
497	Tamsidwadi	Malshiras
498	Tandulwadi	Malshiras
499	Tirwandi	Malshiras
500	Velapur	Malshiras
501	Akole	Mangalvedhe
502	Andhalgaon	Mangalvedhe
503	Andhalgaon	Mangalvedhe
504	Arali	Mangalvedhe
505	Arali	Mangalvedhe
506	Arali	Mangalvedhe
507	Bavachi	Mangalvedhe
508	Bavachi	Mangalvedhe
509	Bhalwani	Mangalvedhe

SN	Village	Taluka
510	Bhose	Mangalvedhe
511	Bhose	Mangalvedhe
512	Bhose	Mangalvedhe
513	Bhose	Mangalvedhe
514	Borale	Mangalvedhe
515	Borale	Mangalvedhe
516	Bramhapuri	Mangalvedhe
517	Bramhapuri	Mangalvedhe
518	Bramhapuri	Mangalvedhe
519	Chikhalgi	Mangalvedhe
520	Chikhalgi	Mangalvedhe
521	Chikhalgi	Mangalvedhe
522	Chikhalgi	Mangalvedhe
523	Dharamgaon	Mangalvedhe
524	Dhavalas	Mangalvedhe
525	Donaj	Mangalvedhe
526	Dongargaon	Mangalvedhe
527	Fatewadi	Mangalvedhe
528	Gharniki	Mangalvedhe
529	Gonewadi	Mangalvedhe
530	Gunjegaon	Mangalvedhe
531	Hajapur	Mangalvedhe
532	Huljanti	Mangalvedhe
533	Huljanti	Mangalvedhe
534	Huljanti	Mangalvedhe
535	Huljanti	Mangalvedhe
536	Huljanti	Mangalvedhe
537	Huljanti	Mangalvedhe
538	Hunnar	Mangalvedhe
539	Hunnar	Mangalvedhe
540	Hunnar	Mangalvedhe
541	Jitti	Mangalvedhe
542	Karjal	Mangalvedhe
543	Katral	Mangalvedhe
544	Khawe	Mangalvedhe
545	Khupsangi	Mangalvedhe
546	Khupsangi	Mangalvedhe
547	Khupsangi	Mangalvedhe
548	Lavangi	Mangalvedhe
549	Laxami Dahiwadi	Mangalvedhe
550	Lendve Chinchale	Mangalvedhe
551	Lonar	Mangalvedhe
552	Mahamadabad (Hunnar)	Mangalvedhe
553	Mahamadabad (Hunnar)	Mangalvedhe
554	Mallewadi	Mangalvedhe
555	Manewadi	Mangalvedhe
556	Mangalvedhe	Mangalvedhe

SN	Village	Taluka
557	Mangalvedhe	Mangalvedhe
558	Mangalvedhe	Mangalvedhe
559	Mangalvedhe	Mangalvedhe
560	Mangalvedhe	Mangalvedhe
561	Mangalvedhe	Mangalvedhe
562	Mangalvedhe	Mangalvedhe
563	Mangalvedhe	Mangalvedhe
564	Mangalvedhe	Mangalvedhe
565	Mangalvedhe	Mangalvedhe
566	Mangalvedhe	Mangalvedhe
567	Marapur	Mangalvedhe
568	Maravade	Mangalvedhe
569	Metkarwadi(NV)(15)	Mangalvedhe
570	Mudhavi	Mangalvedhe
571	Mundhewadi	Mangalvedhe
572	Mundhewadi	Mangalvedhe
573	Mundhewadi	Mangalvedhe
574	Nandeshwar	Mangalvedhe
575	Nandur	Mangalvedhe
576	Nimboni	Mangalvedhe
577	Padolkarwadi	Mangalvedhe
578	Radde	Mangalvedhe
579	Rahatewadi	Mangalvedhe
580	Salagar Bk	Mangalvedhe
581	Salagar Bk	Mangalvedhe
582	Salagar Bk	Mangalvedhe
583	Salagar Bk	Mangalvedhe
584	Salagar Bk	Mangalvedhe
585	Salagar Bk	Mangalvedhe
586	Salagar Bk	Mangalvedhe
587	Salagar Kh	Mangalvedhe
588	Salagar Kh	Mangalvedhe
589	Salagar Kh	Mangalvedhe
590	Shelewadi	Mangalvedhe
591	Shirashi	Mangalvedhe
592	Shirnadgi	Mangalvedhe
593	Siddapur	Mangalvedhe
594	Siddapur	Mangalvedhe
595	Soddi	Mangalvedhe
596	Tamadardi	Mangalvedhe
597	Tamadardi	Mangalvedhe
598	Tandor	Mangalvedhe
599	Uchethan	Mangalvedhe
600	Yelagi	Mangalvedhe
601	Adhegaon	Mohol
602	Angar	Mohol
603	Ankoli	Mohol

SN	Village	Taluka
604	Arbali	Mohol
605	ArjunSond	Mohol
606	Asti	Mohol
607	Aundhi	Mohol
608	Aundhi	Mohol
609	Bhoire	Mohol
610	Bitle	Mohol
611	Bople	Mohol
612	Degaon	Mohol
613	Degaon	Mohol
614	Deodi	Mohol
615	Dhokbabulgaon	Mohol
616	Diksal	Mohol
617	Ghorpadi	Mohol
618	Ghotewadi	Mohol
619	Hingani (Nipani)	Mohol
620	Hiwre	Mohol
621	Hiwre	Mohol
622	Jamgaon Kh	Mohol
623	Kamti Kh	Mohol
624	Katewadi	Mohol
625	Katewadi	Mohol
626	Khandali	Mohol
627	Khandali	Mohol
628	Kharkatne	Mohol
629	Khuneshwar	Mohol
630	Kolegaon	Mohol
631	Konheri	Mohol
632	Korwali	Mohol
633	Korwali	Mohol
634	Kuranwadi	Mohol
635	Kuranwadi (Ashti)	Mohol
636	Kurul	Mohol
637	Lamboti	Mohol
638	Lamboti	Mohol
639	Malikpeth	Mohol
640	Miri	Mohol
641	Mohol	Mohol
642	Mohol	Mohol
643	Mohol	Mohol
644	Mohol	Mohol
645	Mohol	Mohol
646	Mohol	Mohol
647	Morvanchi	Mohol
648	Mundhewadi	Mohol
649	Nalbandwadi	Mohol
650	Nandgaon	Mohol

SN	Village	Taluka
651	Narkhed	Mohol
652	Parmeshwar-pimpri	Mohol
653	Paslewadi	Mohol
654	Patkul	Mohol
655	Patkul	Mohol
656	Peertakali	Mohol
657	Peertakali	Mohol
658	Pennur	Mohol
659	Pennur	Mohol
660	Pennur	Mohol
661	Pennur	Mohol
662	Pokharapur	Mohol
663	Pophali	Mohol
664	Sawaleshwar	Mohol
665	Sawaleshwar	Mohol
666	Sawaleshwar	Mohol
667	Shingoli	Mohol
668	Shingoli	Mohol
669	Shirapur(MO)	Mohol
670	Shirapur(Solapur)	Mohol
671	Sohale	Mohol
672	Tambole	Mohol
673	Taratgaon	Mohol
674	Waddegaon	Mohol
675	Wadwal	Mohol
676	Wagholi	Mohol
677	Wagholiwadi	Mohol
678	Warkute	Mohol
679	Warkute	Mohol
680	Watwate	Mohol
681	Watwate	Mohol
682	Wirawade Bk	Mohol
683	Wirawade Bk	Mohol
684	Wirawade Bk	Mohol
685	Wirwade Kh	Mohol
686	Yenaki	Mohol
687	Ajansond	Pandharpur
688	Ambe	Pandharpur
689	Ambe	Pandharpur
690	Ambe	Pandharpur
691	Anawali	Pandharpur
692	Avhe	Pandharpur
693	Babhulgaon	Pandharpur
694	Babhulgaon	Pandharpur
695	Bhandi Shegaon	Pandharpur
696	Bhandi Shegaon	Pandharpur
697	Bhatumbare	Pandharpur

SN	Village	Taluka
698	Bhose	Pandharpur
699	Bhose	Pandharpur
700	Bhose	Pandharpur
701	Bohali	Pandharpur
702	Chale	Pandharpur
703	Chilaiwadi	Pandharpur
704	Chincholi Bhose	Pandharpur
705	Chinchumbe	Pandharpur
706	Degaon	Pandharpur
707	Degaon	Pandharpur
708	Degaon	Pandharpur
709	Devade	Pandharpur
710	Eklaspur	Pandharpur
711	Eklaspur	Pandharpur
712	Gopalpur	Pandharpur
713	Gopalpur	Pandharpur
714	Gurasale	Pandharpur
715	Gurasale	Pandharpur
716	Ishwar Wathar	Pandharpur
717	Ite	Pandharpur
718	Jainwadi	Pandharpur
719	Karkamb	Pandharpur
720	Kasegaon	Pandharpur
721	Kasegaon	Pandharpur
722	Kauthali	Pandharpur
723	Kauthali	Pandharpur
724	Kauthali	Pandharpur
725	Kauthali	Pandharpur
726	Khardi	Pandharpur
727	Khed Bhalawani	Pandharpur
728	Khed Bhose	Pandharpur
729	Khed Bhose	Pandharpur
730	Korty	Pandharpur
731	Mendhapur	Pandharpur
732	Narayan Chincholi	Pandharpur
733	Narayan Chincholi	Pandharpur
734	Nematwadi	Pandharpur
735	Nepatgaon	Pandharpur
736	Ozewadi	Pandharpur
737	Palshi	Pandharpur
738	Pandharewadi	Pandharpur
739	Pehe	Pandharpur
740	Phandarpur	Pandharpur
741	Pirachi Kuroli	Pandharpur
742	Pirachi Kuroli	Pandharpur
743	Pohargaon	Pandharpur
744	Puluj	Pandharpur

SN	Village	Taluka
745	Pulujwadi	Pandharpur
746	Ropale	Pandharpur
747	Sangavi	Pandharpur
748	Sarkoli	Pandharpur
749	Shankargaon	Pandharpur
750	Shelve	Pandharpur
751	Shetphal	Pandharpur
752	Shirdhon	Pandharpur
753	Shirgaon	Pandharpur
754	Tarapur	Pandharpur
755	Tavashi	Pandharpur
756	Tavashi	Pandharpur
757	Tavashi	Pandharpur
758	Venunagar (NV) (27)	Pandharpur
759	Wadi Kuroli	Pandharpur
760	Wadi Kuroli	Pandharpur
761	Wakhari	Pandharpur
762	Wakhari	Pandharpur
763	Wakhari	Pandharpur
764	Aglavewadi	Sangole
765	Akola	Sangole
766	Alegaon	Sangole
767	Alegaon	Sangole
768	Bamani	Sangole
769	Bamani	Sangole
770	Bandgarwadi	Sangole
771	Bandgarwadi	Sangole
772	Chikmahud	Sangole
773	Chikmahud	Sangole
774	Chincholi	Sangole
775	Chincholi	Sangole
776	Devale	Sangole
777	Devale	Sangole
778	Dhayati	Sangole
779	Dhayati	Sangole
780	Dhayati	Sangole
781	Dongargaon	Sangole
782	Galavewadi	Sangole
783	Gavadewadi	Sangole
784	Gheradi	Sangole
785	Gheradi	Sangole
786	Gheradi	Sangole
787	Hatid	Sangole
788	Hatid	Sangole
789	Hatid	Sangole
790	Itaki	Sangole
791	Jadhavwadi(N.V.)	Sangole

SN	Village	Taluka
792	Javala	Sangole
793	Jujarpur	Sangole
794	Juni Lotewadi(NV-14)	Sangole
795	Kadlas	Sangole
796	Kadlas	Sangole
797	Kadlas	Sangole
798	Kamlapur	Sangole
799	Karandewadi	Sangole
800	Katfal	Sangole
801	Khavaspur	Sangole
802	Kole	Sangole
803	Kole	Sangole
804	Kombadwadi	Sangole
805	Lotewadi	Sangole
806	Lotewadi	Sangole
807	Mahim	Sangole
808	Mahim	Sangole
809	Mahud Bk	Sangole
810	Mahud Bk	Sangole
811	Mahud Bk	Sangole
812	Mahud Bk	Sangole
813	Mahud Bk	Sangole
814	Mahud Bk	Sangole
815	Mahud Bk	Sangole
816	Medsingi	Sangole
817	Medsingi	Sangole
818	Methvade	Sangole
819	Methvade	Sangole
820	Narale	Sangole
821	Naralewadi	Sangole
822	Naralewadi	Sangole
823	Pachegaon Bk	Sangole
824	Salagarwadi(NV-49)	Sangole
825	Sangole	Sangole
826	Sangole	Sangole
827	Sangole	Sangole
828	Sangole	Sangole
829	Sangole	Sangole
830	Shivane	Sangole
831	Sonand	Sangole
832	Sonand	Sangole
833	Tarangewadi	Sangole
834	Udanwadi	Sangole
835	Vasud	Sangole
836	Wadegaon	Sangole
837	Wadegaon	Sangole
838	Wadegaon	Sangole

SN	Village	Taluka
839	Waki Gherdi	Sangole
840	Waki Gherdi	Sangole
841	Waki Shivane	Sangole
842	Waki Shivane	Sangole
843	Watambre	Sangole
844	Yelmar Mangewadi	Sangole
845	Bale	Solapur North
846	Belati	Solapur North
847	Belati	Solapur North
848	Bhagaiwadi	Solapur North
849	Bhagaiwadi	Solapur North
850	Darfal (Bibi)	Solapur North
851	Darfal (Bibi)	Solapur North
852	Darphal (Gawadi)	Solapur North
853	Degaon	Solapur North
854	Degaon	Solapur North
855	Dongaon	Solapur North
856	Dongaon	Solapur North
857	Inchgaon	Solapur North
858	Kalman	Solapur North
859	Kalman	Solapur North
860	Kawathe	Solapur North
861	Kouthali	Solapur North
862	Kouthali	Solapur North
863	Kouthali	Solapur North
864	Kouthali	Solapur North
865	Kumathe	Solapur North
866	Pakani	Solapur North
867	Pakani	Solapur North
868	Pathari	Solapur North
869	Pathari	Solapur North
870	Pathari	Solapur North
871	Ranmasle	Solapur North
872	Ranmasle	Solapur North
873	Ranmasle	Solapur North
874	Ranmasle	Solapur North
875	Sakharewadi	Solapur North
876	Sevalalnagar	Solapur North
877	Shivani	Solapur North
878	Solapur	Solapur North
879	Solapur	Solapur North
880	Solapur	Solapur North
881	Soregaon	Solapur North
882	Soregaon	Solapur North
883	Telgaon	Solapur North
884	Telgaon	Solapur North
885	Telgaon	Solapur North

SN	Village	Taluka
886	Tirhe	Solapur North
887	Tirhe	Solapur North
888	Wangi	Solapur North
889	Wangi	Solapur North
890	Achegaon	Solapur South
891	Akole Mandrup	Solapur South
892	Alegaon	Solapur South
893	Auj Mandrup	Solapur South
894	Aurad	Solapur South
895	Barur	Solapur South
896	Baxi Hipparge	Solapur South
897	Baxi Hipparge	Solapur South
898	Bhandar Kavathe	Solapur South
899	Bhandar Kavathe	Solapur South
900	Bolkavathe	Solapur South
901	Boramani	Solapur South
902	Chincholi	Solapur South
903	Chinchpur	Solapur South
904	Dhotri	Solapur South
905	Doddi	Solapur South
906	Hatur	Solapur South
907	Honmurgi	Solapur South
908	Hotgi	Solapur South
909	Kanbas	Solapur South
910	Kandalgaon	Solapur South
911	Karkal	Solapur South
912	Kasegaon	Solapur South
913	Kumbhari	Solapur South
914	Kumbhari	Solapur South
915	Kumbhari	Solapur South
916	Kurghot	Solapur South
917	Kusur	Solapur South
918	Madre	Solapur South
919	Malkavathe	Solapur South
920	Mandrup	Solapur South
921	Mandrup	Solapur South
922	Mangoli	Solapur South
923	Mulegaon	Solapur South
924	Musti	Solapur South
925	Musti	Solapur South
926	Nimbargi	Solapur South
927	Nimbargi	Solapur South
928	Phatatewadi	Solapur South
929	Sadepur	Solapur South
930	Shingadgaon	Solapur South
931	Shirval	Solapur South
932	Sindkhed	Solapur South

SN	Village	Taluka
933	Tirth	Solapur South
934	Togarhalli	Solapur South
935	Vadakbal	Solapur South
936	Valsang	Solapur South
937	Vinchur	Solapur South
938	Vinchur	Solapur South
939	Wangi	Solapur South
940	Waralegaon	Solapur South

**Annexure-VI (B): Location (tentative) of proposed Artificial Recharge structures
(Check Dams)**

S.No	Village	Taluka	S.No	Village	Taluka
1	Akkalkot	Akkalkot	42	Borgaon	Akkalkot
2	Akkalkot	Akkalkot	43	Boroti Bk	Akkalkot
3	Akkalkot	Akkalkot	44	Boroti Bk	Akkalkot
4	Akkalkot	Akkalkot	45	Boroti Kh.	Akkalkot
5	Akkalkot	Akkalkot	46	Chapalgaon	Akkalkot
6	Akkalkot	Akkalkot	47	Chapalgaon	Akkalkot
7	Akkalkot	Akkalkot	48	Chapalgaon	Akkalkot
8	Akkalkot	Akkalkot	49	Chapalgaon	Akkalkot
9	Akkalkot	Akkalkot	50	Chapalgaon	Akkalkot
10	Akkalkot	Akkalkot	51	Chapalgaon	Akkalkot
11	Andewadi Bk	Akkalkot	52	Chapalgaonwadi	Akkalkot
12	Andewadi Kh	Akkalkot	53	Chapalgaonwadi	Akkalkot
13	Andewadi (Jhangir)	Akkalkot	54	Chikkahall	Akkalkot
14	Ankalage	Akkalkot	55	Chikkahall	Akkalkot
15	Ankalage	Akkalkot	56	Chincholi (Najik)	Akkalkot
16	Badole Bk	Akkalkot	57	Chungi	Akkalkot
17	Badole Bk	Akkalkot	58	Chungi	Akkalkot
18	Badole Bk	Akkalkot	59	Chungi	Akkalkot
19	Badole Bk	Akkalkot	60	Chungi	Akkalkot
20	Badole Kh	Akkalkot	61	Chungi	Akkalkot
21	Bagehalli	Akkalkot	62	Dahitane	Akkalkot
22	Banjgol	Akkalkot	63	Dahitane	Akkalkot
23	Banjgol	Akkalkot	64	Dahitane	Akkalkot
24	Banjgol	Akkalkot	65	Dahitanewadi	Akkalkot
25	Barhanpur	Akkalkot	66	Darshanal	Akkalkot
26	Basalegaon	Akkalkot	67	Darshanal	Akkalkot
27	Basalegaon	Akkalkot	68	Devikavathe	Akkalkot
28	Basalegaon	Akkalkot	69	Devikavathe	Akkalkot
29	Bhosage	Akkalkot	70	Dodyal	Akkalkot
30	Bhosage	Akkalkot	71	Dodyal	Akkalkot
31	Bhurikavathe	Akkalkot	72	Dombar-Jaw	Akkalkot
32	Bhurikavathe	Akkalkot	73	Dudhani	Akkalkot
33	Boblad	Akkalkot	74	Dudhani	Akkalkot
34	Boblad	Akkalkot	75	Dudhani	Akkalkot
35	Boblad	Akkalkot	76	Dudhani	Akkalkot
36	Boblad	Akkalkot	77	Dudhani	Akkalkot
37	Boregaon	Akkalkot	78	Dudhani	Akkalkot
38	Borgaon	Akkalkot	79	Dudhani	Akkalkot
39	Borgaon	Akkalkot	80	Galoragi	Akkalkot
40	Borgaon	Akkalkot	81	Galoragi	Akkalkot
41	Borgaon	Akkalkot	82	Gaudgaon Bk	Akkalkot

S.No	Village	Taluka	S.No	Village	Taluka
83	Gaudgaon Bk	Akkalkot	126	Jeur	Akkalkot
84	Gaudgaon Bk	Akkalkot	127	Jeur	Akkalkot
85	Gholasgaon	Akkalkot	128	Jeur	Akkalkot
86	Gholasgaon	Akkalkot	129	Jeur	Akkalkot
87	Gholasgaon	Akkalkot	130	Jeur	Akkalkot
88	Gholasgaon	Akkalkot	131	Jeur	Akkalkot
89	Ghungarega	Akkalkot	132	Jeur	Akkalkot
90	Gogaon	Akkalkot	133	Jeur	Akkalkot
91	Gogaon	Akkalkot	134	Jeur	Akkalkot
92	Gogaon	Akkalkot	135	Jeurwadi(NV-1)	Akkalkot
93	Goudgaon Kh	Akkalkot	136	Kadabgaon	Akkalkot
94	Guddewadi	Akkalkot	137	Kadabgaon	Akkalkot
95	Guravwadi	Akkalkot	138	Kadabgaon	Akkalkot
96	Guravwadi	Akkalkot	139	Kajikanbas	Akkalkot
97	Guravwadi	Akkalkot	140	Kajikanbas	Akkalkot
98	Haidre	Akkalkot	141	Kajikanbas	Akkalkot
99	Haidre	Akkalkot	142	Kajikanbas	Akkalkot
100	Halchincholi	Akkalkot	143	Kalappawad	Akkalkot
101	Hanjagi	Akkalkot	144	Kalappawad	Akkalkot
102	Hanjagi	Akkalkot	145	Kalappawad	Akkalkot
103	Hanjagi	Akkalkot	146	Kalappawadi	Akkalkot
104	Hanjagi	Akkalkot	147	Kalkarjal	Akkalkot
105	Hannur	Akkalkot	148	Kalkarjal	Akkalkot
106	Hannur	Akkalkot	149	Kanthehalli	Akkalkot
107	Hasapur	Akkalkot	150	Karajagi	Akkalkot
108	Hasapur	Akkalkot	151	Karajagi	Akkalkot
109	Hattikanba	Akkalkot	152	Karajagi	Akkalkot
110	Hattikanba	Akkalkot	153	Karajagi	Akkalkot
111	Ibrahimpur	Akkalkot	154	Karajagi	Akkalkot
112	Ibrahimpur	Akkalkot	155	Karajagi	Akkalkot
113	Itage	Akkalkot	156	Karajagi	Akkalkot
114	Jainapur	Akkalkot	157	Karjal	Akkalkot
115	Jainapur	Akkalkot	158	Karjal	Akkalkot
116	Jeur	Akkalkot	159	Karjal	Akkalkot
117	Jeur	Akkalkot	160	Kegaon Bk	Akkalkot
118	Jeur	Akkalkot	161	Khairat	Akkalkot
119	Jeur	Akkalkot	162	Khanapur	Akkalkot
120	Jeur	Akkalkot	163	Kini	Akkalkot
121	Jeur	Akkalkot	164	Kini	Akkalkot
122	Jeur	Akkalkot	165	Kini	Akkalkot
123	Jeur	Akkalkot	166	Kiniwadi	Akkalkot
124	Jeur	Akkalkot	167	Kirnalli	Akkalkot
125	Jeur	Akkalkot	168	Kirnalli	Akkalkot

S.No	Village	Taluka	S.No	Village	Taluka
169	Konhali	Akkalkot	212	Nagansur	Akkalkot
170	Konhali	Akkalkot	213	Nagansur	Akkalkot
171	Korsegaon	Akkalkot	214	Nagore	Akkalkot
172	Korsegaon	Akkalkot	215	Nagore	Akkalkot
173	Kurnur	Akkalkot	216	Nagore	Akkalkot
174	Kurnur	Akkalkot	217	Nanhegaon	Akkalkot
175	Kurnur	Akkalkot	218	Navindgi	Akkalkot
176	Mahalaxminagar	Akkalkot	219	Navindgi	Akkalkot
177	Mahalaxminagar	Akkalkot	220	Navindgi	Akkalkot
178	Maindargi (Rural)	Akkalkot	221	Navindgi	Akkalkot
179	Maindargi (Rural)	Akkalkot	222	Palapur	Akkalkot
180	Maindargi (Rural)	Akkalkot	223	Palapur	Akkalkot
181	Maindargi (Rural)	Akkalkot	224	Pitapur	Akkalkot
182	Maindargi (Rural)	Akkalkot	225	Sadalapur	Akkalkot
183	Maindargi (Rural)	Akkalkot	226	Safale	Akkalkot
184	Maindargi (Rural)	Akkalkot	227	Salgar	Akkalkot
185	Mamdabad	Akkalkot	228	Salgar	Akkalkot
186	Mangrul	Akkalkot	229	Salgar	Akkalkot
187	Mangrul	Akkalkot	230	Salgar	Akkalkot
188	Mangrul	Akkalkot	231	Salgar	Akkalkot
189	Mangrul	Akkalkot	232	Salgar	Akkalkot
190	Mangrul	Akkalkot	233	Salgar	Akkalkot
191	Marathwadi	Akkalkot	234	Salgar	Akkalkot
192	Marathwadi	Akkalkot	235	Salgar	Akkalkot
193	Marathwadi	Akkalkot	236	Salgar	Akkalkot
194	Matanhalli	Akkalkot	237	Sangavi Bk	Akkalkot
195	Matanhalli	Akkalkot	238	Sangavi Kh	Akkalkot
196	Mhaisalge	Akkalkot	239	Sangogi (B	Akkalkot
197	Mhaisalge	Akkalkot	240	Sangogi Aland	Akkalkot
198	Mhaisalge	Akkalkot	241	Sangogi Aland	Akkalkot
199	Mirajgi	Akkalkot	242	Satan Dudhani	Akkalkot
200	Motyal	Akkalkot	243	Satan Dudhani	Akkalkot
201	Mugali	Akkalkot	244	Satan Dudhani	Akkalkot
202	Mugali	Akkalkot	245	Satan Dudhani	Akkalkot
203	Mugali	Akkalkot	246	Sevanagar	Akkalkot
204	Mugali	Akkalkot	247	Shawal	Akkalkot
205	Naganhalli	Akkalkot	248	Shawal	Akkalkot
206	Nagansur	Akkalkot	249	Shirasi	Akkalkot
207	Nagansur	Akkalkot	250	Shirwal	Akkalkot
208	Nagansur	Akkalkot	251	Shirwal	Akkalkot
209	Nagansur	Akkalkot	252	Shirwal	Akkalkot
210	Nagansur	Akkalkot	253	Shirwalwadi	Akkalkot
211	Nagansur	Akkalkot	254	Sinnur	Akkalkot

S.No	Village	Taluka	S.No	Village	Taluka
255	Sinnur	Akkalkot	298	Barshi Urban	Barshi
256	Sinnur	Akkalkot	299	Barshi Urban	Barshi
257	Sinnur	Akkalkot	300	Barshi Urban	Barshi
258	Sinnur	Akkalkot	301	Bavi	Barshi
259	Solase Lamantanda	Akkalkot	302	Bavi	Barshi
260	Sulerjawalage	Akkalkot	303	Bavi	Barshi
261	Sulerjawalage	Akkalkot	304	Bavi	Barshi
262	Talewad	Akkalkot	305	Bavi	Barshi
263	Tolnur	Akkalkot	306	Belgaon	Barshi
264	Tolnur	Akkalkot	307	Belgaon	Barshi
265	Tolnur	Akkalkot	308	Bhansale	Barshi
266	Tolnur	Akkalkot	309	Bhansale	Barshi
267	Tolnur	Akkalkot	310	Bhatambare	Barshi
268	Tolnur	Akkalkot	311	Bhatambare	Barshi
269	Tolnur	Akkalkot	312	Bhoinje	Barshi
270	Torani	Akkalkot	313	Bhoinje	Barshi
271	Torani	Akkalkot	314	Bhoinje	Barshi
272	Udagi	Akkalkot	315	Bhoinje	Barshi
273	Udagi	Akkalkot	316	Bhoinje	Barshi
274	Udagi	Akkalkot	317	Borgaon (Kh)	Barshi
275	Udagi	Akkalkot	318	Borgaon (Kh)	Barshi
276	Udagi	Akkalkot	319	Chare	Barshi
277	Umarge	Akkalkot	320	Chare	Barshi
278	Wagdari	Akkalkot	321	Chare	Barshi
279	Wagdari	Akkalkot	322	Chare	Barshi
280	Wagdari	Akkalkot	323	Chikharde	Barshi
281	Wagdari	Akkalkot	324	Chikharde	Barshi
282	Agalgaon	Barshi	325	Chikharde	Barshi
283	Agalgaon	Barshi	326	Chikharde	Barshi
284	Alipur	Barshi	327	Chikharde	Barshi
285	Ambabaiwadi	Barshi	328	Chinchkhopan	Barshi
286	Arangaon	Barshi	329	Chinchkhopan	Barshi
287	Balewadi	Barshi	330	Chincholi	Barshi
288	Balewadi	Barshi	331	Chincholi	Barshi
289	Barshi	Barshi	332	Chumb	Barshi
290	Barshi Urban	Barshi	333	Chumb	Barshi
291	Barshi Urban	Barshi	334	Dadshinge	Barshi
292	Barshi Urban	Barshi	335	Dadshinge	Barshi
293	Barshi Urban	Barshi	336	Dahithane	Barshi
294	Barshi Urban	Barshi	337	Devgaon	Barshi
295	Barshi Urban	Barshi	338	Dhamangaon (A)	Barshi
296	Barshi Urban	Barshi	339	Dhamangaon (A)	Barshi
297	Barshi Urban	Barshi	340	Dhamgaon (Dumala)	Barshi

S.No	Village	Taluka	S.No	Village	Taluka
341	Dhamgaon (Dumala)	Barshi	384	Kalambodi(A)	Barshi
342	Dhamgaon (Dumala)	Barshi	385	Kalambodi(A)	Barshi
343	Dhamgaon (Dumala)	Barshi	386	Kalambodi(A)	Barshi
344	Dhorale	Barshi	387	Kalambwadi	Barshi
345	Dhotre	Barshi	388	Kalambwadi	Barshi
346	Gadegaon	Barshi	389	Kalambwadi	Barshi
347	Gaudgaon	Barshi	390	Kandalgaon	Barshi
348	Gaudgaon	Barshi	391	Kandalgaon	Barshi
349	Gaudgaon	Barshi	392	Kari	Barshi
350	Gaudgaon	Barshi	393	Kari	Barshi
351	Ghari	Barshi	394	Kari	Barshi
352	Ghari	Barshi	395	Kari	Barshi
353	Gholvewadi	Barshi	396	Kari	Barshi
354	Gholvewadi	Barshi	397	Kari	Barshi
355	Gholvewadi	Barshi	398	Kari	Barshi
356	Gormale	Barshi	399	Kari	Barshi
357	Gormale	Barshi	400	Kari	Barshi
358	Gormale	Barshi	401	Kari	Barshi
359	Gormale	Barshi	402	Kasari	Barshi
360	Gulpoli	Barshi	403	Kasari	Barshi
361	Gulpoli	Barshi	404	Kasari	Barshi
362	Gulpoli	Barshi	405	Kasarwadi	Barshi
363	Gulpoli	Barshi	406	Kasarwadi	Barshi
364	Gulpoli	Barshi	407	Kategaon	Barshi
365	Gulpoli	Barshi	408	Kategaon	Barshi
366	Gulpoli	Barshi	409	Kategaon	Barshi
367	Halduge	Barshi	410	Kavhe	Barshi
368	Halduge	Barshi	411	Kavhe	Barshi
369	Halduge	Barshi	412	Kavhe	Barshi
370	Hattij	Barshi	413	Kavhe	Barshi
371	Hingani(Pangaon)	Barshi	414	Kavhe	Barshi
372	Hingani(Ratanjan)	Barshi	415	Khadkoni	Barshi
373	Indapur	Barshi	416	Khadkoni	Barshi
374	Irlle	Barshi	417	Khamgaon	Barshi
375	Jamgaon (Agalgaon)	Barshi	418	Khamgaon	Barshi
376	Jamgaon (Agalgaon)	Barshi	419	Khamgaon	Barshi
377	Jamgaon (Agalgaon)	Barshi	420	Khamgaon	Barshi
378	Jamgaon (Agalgaon)	Barshi	421	Khamgaon	Barshi
379	Jamgaon (Agalgaon)	Barshi	422	Khandavi	Barshi
380	Jamgaon (Agalgaon)	Barshi	423	Khandavi	Barshi
381	Jamgaon (P)	Barshi	424	Khandavi	Barshi
382	Jamgaon (P)	Barshi	425	Khandavi	Barshi
383	Kalambodi(A)	Barshi	426	Koregaon	Barshi

S.No	Village	Taluka	S.No	Village	Taluka
427	Koregaon	Barshi	470	Mungashi	Barshi
428	Korfale	Barshi	471	Mungashi	Barshi
429	Korfale	Barshi	472	Nagobachiwadi	Barshi
430	Korfale	Barshi	473	Nandani	Barshi
431	Korfale	Barshi	474	Nandani	Barshi
432	Korfale	Barshi	475	Nari (Bhandewadi)	Barshi
433	Korfale	Barshi	476	Nari (Bhandewadi)	Barshi
434	Korfale	Barshi	477	Nari (Bhandewadi)	Barshi
435	Korfale	Barshi	478	Nari (Bhandewadi)	Barshi
436	Korfale	Barshi	479	Nari (Bhandewadi)	Barshi
437	Korfale	Barshi	480	Nariwadi (NV) (48)	Barshi
438	Korfale	Barshi	481	Nariwadi (NV) (48)	Barshi
439	Ladole	Barshi	482	Pandhari	Barshi
440	Ladole	Barshi	483	Pandhari	Barshi
441	Ladole	Barshi	484	Pandhari	Barshi
442	Lakshychiwadi(N.V.)	Barshi	485	Pandhari	Barshi
443	Lakshychiwadi(N.V.)	Barshi	486	Pandhari	Barshi
444	Mahagaon	Barshi	487	Pangaon	Barshi
445	Malegaon	Barshi	488	Pangaon	Barshi
446	Malegaon	Barshi	489	Pangaon	Barshi
447	Malegaon	Barshi	490	Pangaon	Barshi
448	Malegaon	Barshi	491	Pangaon	Barshi
449	Malegaon	Barshi	492	Pangaon	Barshi
450	Malegaon	Barshi	493	Pangaon	Barshi
451	Malegaon	Barshi	494	Pangaon	Barshi
452	Malegaon	Barshi	495	Pangaon	Barshi
453	Malegaon	Barshi	496	Pangaon	Barshi
454	Malegaon	Barshi	497	Pangaon	Barshi
455	Malegaon	Barshi	498	Pangaon	Barshi
456	Malwandi	Barshi	499	Pangaon	Barshi
457	Malwandi	Barshi	500	Pangaon	Barshi
458	Malwandi	Barshi	501	Pangri	Barshi
459	Malwandi	Barshi	502	Pangri	Barshi
460	Malwandi	Barshi	503	Pangri	Barshi
461	Malwandi	Barshi	504	Pangri	Barshi
462	Mamdapur	Barshi	505	Pangri	Barshi
463	Mandegaon	Barshi	506	Pathari	Barshi
464	Manegaon	Barshi	507	Phaphalwadi	Barshi
465	Manegaon	Barshi	508	Pimpalwadi	Barshi
466	Manegaon	Barshi	509	Pimpalwadi	Barshi
467	Manegaon	Barshi	510	Pimpari (Pangaon)	Barshi
468	Mouje Tadwale	Barshi	511	Puri	Barshi
469	Mouje Tadwale	Barshi	512	Puri	Barshi

S.No	Village	Taluka	S.No	Village	Taluka
513	Puri	Barshi	556	Shendri	Barshi
514	Raleras	Barshi	557	Shendri	Barshi
515	Raleras	Barshi	558	Shirale	Barshi
516	Raleras	Barshi	559	Shripat Pimprir	Barshi
517	Raleras	Barshi	560	Shripat Pimprir	Barshi
518	Raleras	Barshi	561	Shripat Pimprir	Barshi
519	Ratanjan	Barshi	562	Shripat Pimprir	Barshi
520	Ratanjan	Barshi	563	Shripat Pimprir	Barshi
521	Ratanjan	Barshi	564	Shripat Pimprir	Barshi
522	Rui	Barshi	565	Shripat Pimprir	Barshi
523	Rui	Barshi	566	Shripat Pimprir	Barshi
524	Sakat	Barshi	567	Shripat Pimprir	Barshi
525	Sakat	Barshi	568	Shripat Pimprir	Barshi
526	Sakat	Barshi	569	Shripat Pimprir	Barshi
527	Sangamner	Barshi	570	Shripat Pimprir	Barshi
528	Sarjapur	Barshi	571	Surdi	Barshi
529	Sarole	Barshi	572	Surdi	Barshi
530	Sarole	Barshi	573	Surdi	Barshi
531	Sasure	Barshi	574	Surdi	Barshi
532	Sasure	Barshi	575	Surdi	Barshi
533	Sasure	Barshi	576	Tadsoudne	Barshi
534	Sasure	Barshi	577	Tambewadi	Barshi
535	Sasure	Barshi	578	Tambewadi	Barshi
536	Sasure	Barshi	579	Tandulwadi	Barshi
537	Saundare	Barshi	580	Tandulwadi	Barshi
538	Saundare	Barshi	581	Tandulwadi	Barshi
539	Saundare	Barshi	582	Tandulwadi	Barshi
540	Saundare	Barshi	583	Tandulwadi	Barshi
541	Shelgaon (Markad)	Barshi	584	Turk Pimpari	Barshi
542	Shelgaon (Markad)	Barshi	585	Turk Pimpari	Barshi
543	Shelgaon (Vhale)	Barshi	586	Turk Pimpari	Barshi
544	Shelgaon (Vhale)	Barshi	587	Ukadgaon	Barshi
545	Shelgaon(R)	Barshi	588	Ukadgaon	Barshi
546	Shelgaon(R)	Barshi	589	Ukadgaon	Barshi
547	Shelgaon(R)	Barshi	590	Ukadgaon	Barshi
548	Shelgaon(R)	Barshi	591	Ukadgaon	Barshi
549	Shelgaon(R)	Barshi	592	Ukadgaon	Barshi
550	Shelgaon(R)	Barshi	593	Ukadgaon	Barshi
551	Shelgaon(R)	Barshi	594	Ukadgaon	Barshi
552	Shendri	Barshi	595	Undegaon	Barshi
553	Shendri	Barshi	596	Undegaon	Barshi
554	Shendri	Barshi	597	Upalai (Thonge)	Barshi
555	Shendri	Barshi	598	Upalai (Thonge)	Barshi

S.No	Village	Taluka	S.No	Village	Taluka
599	Upalai (Thonge)	Barshi	642	Zaregaon	Barshi
600	Upalai (Thonge)	Barshi	643	Zaregaon	Barshi
601	Upalai (Thonge)	Barshi	644	Zaregaon	Barshi
602	Upalai (Thonge)	Barshi	645	Aljapur	Karmala
603	Upalai (Thonge)	Barshi	646	Aljapur	Karmala
604	Upalai (Thonge)	Barshi	647	Alsunde	Karmala
605	Upalai (Thonge)	Barshi	648	Arjunnagar	Karmala
606	Upalai (Thonge)	Barshi	649	Arjunnagar	Karmala
607	Upalai (Thonge)	Barshi	650	Awati	Karmala
608	Upalai (Thonge)	Barshi	651	Bhagatwadi	Karmala
609	Upalai (Thonge)	Barshi	652	Bhagatwadi	Karmala
610	Upalai (Thonge)	Barshi	653	Bhagatwadi	Karmala
611	Upalai (Thonge)	Barshi	654	Bhagatwadi	Karmala
612	Upale (Dumala)	Barshi	655	Bhagatwadi	Karmala
613	Upale (Dumala)	Barshi	656	Bhalavni	Karmala
614	Upale (Dumala)	Barshi	657	Bhalavni	Karmala
615	Upale (Dumala)	Barshi	658	Bhalavni	Karmala
616	Upale (Dumala)	Barshi	659	Bhalavni	Karmala
617	Upale (Dumala)	Barshi	660	Bhalavni	Karmala
618	Vairag	Barshi	661	Bhalavni	Karmala
619	Vairag	Barshi	662	Bhilarwadi	Karmala
620	Vairag	Barshi	663	Bhilarwadi	Karmala
621	Vairag	Barshi	664	Bhilarwadi	Karmala
622	Vairag	Barshi	665	Bhilarwadi	Karmala
623	Walwad	Barshi	666	Bhilarwadi	Karmala
624	Wanewadi	Barshi	667	Bhilarwadi	Karmala
625	Wangarwadi	Barshi	668	Bhilarwadi	Karmala
626	Wangarwadi	Barshi	669	Bhilarwadi	Karmala
627	Wangarwadi	Barshi	670	Bhilarwadi	Karmala
628	Wangarwadi	Barshi	671	Bhilarwadi	Karmala
629	Yawali	Barshi	672	Bhose	Karmala
630	Yawali	Barshi	673	Bhose	Karmala
631	Yawali	Barshi	674	Borgaon	Karmala
632	Yawali	Barshi	675	Dahigaon	Karmala
633	Yawali	Barshi	676	Delwadi	Karmala
634	Yawali	Barshi	677	Delwadi	Karmala
635	Yawali	Barshi	678	Delwadi	Karmala
636	Yawali	Barshi	679	Deolali	Karmala
637	Yawali	Barshi	680	Deolali	Karmala
638	Yawali	Barshi	681	Deolali	Karmala
639	Yelamb	Barshi	682	Deolali	Karmala
640	Zadi	Barshi	683	Deolali	Karmala
641	Zaregaon	Barshi	684	Deolali	Karmala

S.No	Village	Taluka	S.No	Village	Taluka
685	Deolali	Karmala	728	Hisare	Karmala
686	Deolali	Karmala	729	Hisare	Karmala
687	Deolali	Karmala	730	Hisare	Karmala
688	Deolali	Karmala	731	Hisare	Karmala
689	Deolali	Karmala	732	Hivare	Karmala
690	Deolali	Karmala	733	Hivare	Karmala
691	Deolali	Karmala	734	Hiwarwadi	Karmala
692	Deolali	Karmala	735	Hiwarwadi	Karmala
693	Deolali	Karmala	736	Hiwarwadi	Karmala
694	Dhaykhindi	Karmala	737	Hiwarwadi	Karmala
695	Dhaykhindi	Karmala	738	Jategaon	Karmala
696	Dhaykhindi	Karmala	739	Jeur	Karmala
697	Dhaykhindi	Karmala	740	Jeurwadi	Karmala
698	Dhaykhindi	Karmala	741	Jinnti	Karmala
699	Dhaykhindi	Karmala	742	Jinnti	Karmala
700	Divegavan	Karmala	743	Jinnti	Karmala
701	Divegavan	Karmala	744	Jinnti	Karmala
702	Gaundare	Karmala	745	Jinnti	Karmala
703	Gaundare	Karmala	746	Jinnti	Karmala
704	Gaundare	Karmala	747	Jinnti	Karmala
705	Gaundare	Karmala	748	Jinnti	Karmala
706	Gharatwadi	Karmala	749	Jinnti	Karmala
707	Ghargaon	Karmala	750	Kamone	Karmala
708	Ghargaon	Karmala	751	Kamone	Karmala
709	Ghargaon	Karmala	752	Kamone	Karmala
710	Ghargaon	Karmala	753	Karanje	Karmala
711	Ghargaon	Karmala	754	Karmala (Rural)	Karmala
712	Ghargaon	Karmala	755	Karmala (Rural)	Karmala
713	Ghargaon	Karmala	756	Karmala (Rural)	Karmala
714	Ghargaon	Karmala	757	Karmala (Rural)	Karmala
715	Ghoti	Karmala	758	Karmala (Rural)	Karmala
716	Ghoti	Karmala	759	Karmala(Urban)	Karmala
717	Ghoti	Karmala	760	Karmala(Urban)	Karmala
718	Ghoti	Karmala	761	Karmala(Urban)	Karmala
719	Ghoti	Karmala	762	Karmala(Urban)	Karmala
720	Ghoti	Karmala	763	Katraj	Karmala
721	Ghoti	Karmala	764	Katraj	Karmala
722	Gulmarwadi	Karmala	765	Kavitgaon	Karmala
723	Gulmarwadi	Karmala	766	Kawalwadi	Karmala
724	Hingani	Karmala	767	Kawalwadi	Karmala
725	Hisare	Karmala	768	Kawalwadi	Karmala
726	Hisare	Karmala	769	Kedgaon	Karmala
727	Hisare	Karmala	770	Kedgaon	Karmala

S.No	Village	Taluka	S.No	Village	Taluka
771	Kedgaon	Karmala	814	Nerle	Karmala
772	Kem	Karmala	815	Nerle	Karmala
773	Kem	Karmala	816	Nerle	Karmala
774	Kem	Karmala	817	Nerle	Karmala
775	Kem	Karmala	818	Nerle	Karmala
776	Kem	Karmala	819	Nerle	Karmala
777	Kem	Karmala	820	Nerle	Karmala
778	Kem	Karmala	821	Nimbhore	Karmala
779	Kem	Karmala	822	Nimbhore	Karmala
780	Kem	Karmala	823	Nimbhore	Karmala
781	Kem	Karmala	824	Nimbhore	Karmala
782	Kem	Karmala	825	Nimbhore	Karmala
783	Kem	Karmala	826	Nimbhore	Karmala
784	Kem	Karmala	827	Nimbhore	Karmala
785	Kem	Karmala	828	Nimgaon (H)	Karmala
786	Kem	Karmala	829	Pande	Karmala
787	Kem	Karmala	830	Pande	Karmala
788	Kem	Karmala	831	Pande	Karmala
789	Kem	Karmala	832	Pande	Karmala
790	Kem	Karmala	833	Pande	Karmala
791	Khadaki	Karmala	834	Pande	Karmala
792	Khambewadi	Karmala	835	Pande	Karmala
793	Khatgaon	Karmala	836	Pande	Karmala
794	Kolgaon	Karmala	837	Pathurdi	Karmala
795	Kondhej	Karmala	838	Pathurdi	Karmala
796	Kumbhargaon	Karmala	839	Pathurdi	Karmala
797	Kumbhargaon	Karmala	840	Pathurdi	Karmala
798	Kumbhargaon	Karmala	841	Pathurdi	Karmala
799	Kumbhargaon	Karmala	842	Phisare	Karmala
800	Kumbhargaon	Karmala	843	Pimpalwadi	Karmala
801	Kumbhargaon	Karmala	844	Pimpalwadi	Karmala
802	Kumbhej	Karmala	845	Pimpalwadi	Karmala
803	Lavhe	Karmala	846	Pimpalwadi	Karmala
804	Lavhe	Karmala	847	Pimpalwadi	Karmala
805	Lavhe	Karmala	848	Pimpalwadi	Karmala
806	Lavhe	Karmala	849	Pondhvadi	Karmala
807	Malwadi	Karmala	850	Pophalaj	Karmala
808	Malwadi	Karmala	851	Potegaon	Karmala
809	Malwadi	Karmala	852	Potegaon	Karmala
810	Mangi	Karmala	853	Potegaon	Karmala
811	Mangi	Karmala	854	Pothare	Karmala
812	Mangi	Karmala	855	Pothare	Karmala
813	Nerle	Karmala	856	Pothare	Karmala

S.No	Village	Taluka	S.No	Village	Taluka
857	Ravgaon	Karmala	900	Savadi	Karmala
858	Ravgaon	Karmala	901	Savadi	Karmala
859	Ravgaon	Karmala	902	Savadi	Karmala
860	Ravgaon	Karmala	903	Savadi	Karmala
861	Ravgaon	Karmala	904	Savadi	Karmala
862	Ravgaon	Karmala	905	Savadi	Karmala
863	Ravgaon	Karmala	906	Savadi	Karmala
864	Ritewadi	Karmala	907	Savadi	Karmala
865	Roshewadi	Karmala	908	Savadi	Karmala
866	Roshewadi	Karmala	909	Savadi	Karmala
867	Sade	Karmala	910	Shelgaon (K)	Karmala
868	Sade	Karmala	911	Shelgaon (K)	Karmala
869	Sade	Karmala	912	Shelgaon (K)	Karmala
870	Sade	Karmala	913	Shetphal	Karmala
871	Sade	Karmala	914	Shetphal	Karmala
872	Sade	Karmala	915	Shetphal	Karmala
873	Sade	Karmala	916	Takali (Rashin)	Karmala
874	Sade	Karmala	917	Taratgaon	Karmala
875	Sade	Karmala	918	Taratgaon	Karmala
876	Sade	Karmala	919	Umradi	Karmala
877	Sade	Karmala	920	Undargaon	Karmala
878	Sade	Karmala	921	Undargaon	Karmala
879	Sade	Karmala	922	Vanjarwadi	Karmala
880	Sade	Karmala	923	Vanjarwadi	Karmala
881	Sade	Karmala	924	Vanjarwadi	Karmala
882	Sade	Karmala	925	Vanjarwadi	Karmala
883	Sade	Karmala	926	Vanjarwadi	Karmala
884	Sade	Karmala	927	Vanjarwadi	Karmala
885	Sade	Karmala	928	Varkute	Karmala
886	Salse	Karmala	929	Varkute	Karmala
887	Salse	Karmala	930	Varkute	Karmala
888	Salse	Karmala	931	Varkute	Karmala
889	Salse	Karmala	932	Varkute	Karmala
890	Salse	Karmala	933	Varkute	Karmala
891	Salse	Karmala	934	Varkute	Karmala
892	Salse	Karmala	935	Varkute	Karmala
893	Salse	Karmala	936	Varkute	Karmala
894	Salse	Karmala	937	Varkute	Karmala
895	Sarapdoh	Karmala	938	Wadachiwadi	Karmala
896	Sarapdoh	Karmala	939	Wadachiwadi	Karmala
897	Sarapdoh	Karmala	940	Wadachiwadi	Karmala
898	Sarapdoh	Karmala	941	Wadachiwadi	Karmala
899	Savadi	Karmala	942	Wadachiwadi	Karmala

S.No	Village	Taluka	S.No	Village	Taluka
943	Wadgaon Kh.	Karmala	986	Badalewadi	Madha
944	Warkatne	Karmala	987	Badalewadi	Madha
945	Warkatne	Karmala	988	Badalewadi	Madha
946	Adegaon	Madha	989	Badalewadi	Madha
947	Adegaon	Madha	990	Badalewadi	Madha
948	Adegaon	Madha	991	Badalewadi	Madha
949	Ahergaon	Madha	992	Badalewadi	Madha
950	Akole Kh	Madha	993	Bairagwadi	Madha
951	Akole Kh	Madha	994	Barloni	Madha
952	Akole Kh	Madha	995	Barloni	Madha
953	Akole Kh	Madha	996	Barloni	Madha
954	Akulgaon	Madha	997	Barloni	Madha
955	Akulgaon	Madha	998	Barloni	Madha
956	Akulgaon	Madha	999	Barloni	Madha
957	Akulgaon	Madha	1000	Barloni	Madha
958	Akumbhe	Madha	1001	Barloni	Madha
959	Alegaon Bk	Madha	1002	Barloni	Madha
960	Alegaon Kh.	Madha	1003	Barloni	Madha
961	Alegaon Kh.	Madha	1004	Barloni	Madha
962	Alegaon Kh.	Madha	1005	Barloni	Madha
963	Ambad	Madha	1006	Bembale	Madha
964	Ambad	Madha	1007	Bembale	Madha
965	Ambad	Madha	1008	Bhend	Madha
966	Ambad	Madha	1009	Bhend	Madha
967	Anjangaon (Kh)	Madha	1010	Bhogewadi	Madha
968	Anjangaon (Kh)	Madha	1011	Bhosare	Madha
969	Anjangaon (Kh)	Madha	1012	Bhuinje	Madha
970	Anjangaon (Kh)	Madha	1013	Bhuinje	Madha
971	Anjangaon (Kh)	Madha	1014	Bhutashte	Madha
972	Anjangaon (Kh)	Madha	1015	Bhutashte	Madha
973	Anjangaon (Kh)	Madha	1016	Bhutashte	Madha
974	Anjangaon Umate	Madha	1017	Bhutashte	Madha
975	Anjangaon Umate	Madha	1018	Bitergaon	Madha
976	Anjangaon Umate	Madha	1019	Bitergaon	Madha
977	Anjangaon Umate	Madha	1020	Chandaj	Madha
978	Anjangaon Umate	Madha	1021	Chandaj	Madha
979	Aran	Madha	1022	Chandaj	Madha
980	Aran	Madha	1023	Chavanwadi	Madha
981	Aran	Madha	1024	Chavhanwadi	Madha
982	Aran	Madha	1025	Chavhanwadi	Madha
983	Aran	Madha	1026	Chinchgaon	Madha
984	Badalewadi	Madha	1027	Chinchgaon	Madha
985	Badalewadi	Madha	1028	Chinchgaon	Madha

S.No	Village	Taluka	S.No	Village	Taluka
1029	Chincholi	Madha	1072	Kanhergaon	Madha
1030	Chincholi	Madha	1073	Kanhergaon	Madha
1031	Chincholi	Madha	1074	Kanhergaon	Madha
1032	Chobepimpari	Madha	1075	Kanhergaon	Madha
1033	Chobepimpari	Madha	1076	Kanhergaon	Madha
1034	Chobepimpari	Madha	1077	Kanhergaon	Madha
1035	Chobepimpari	Madha	1078	Kapsewadi	Madha
1036	Chobepimpari	Madha	1079	Kavhe	Madha
1037	Dahiwali	Madha	1080	Kavhe	Madha
1038	Dahiwali	Madha	1081	Kavhe	Madha
1039	Dahiwali	Madha	1082	Kavhe	Madha
1040	Dahiwali	Madha	1083	Kewad	Madha
1041	Dahiwali	Madha	1084	Khairao	Madha
1042	Dahiwali	Madha	1085	Khairao	Madha
1043	Dahiwali	Madha	1086	Khairewadi	Madha
1044	Dahiwali	Madha	1087	Khairewadi	Madha
1045	Darfal	Madha	1088	Kumbhej	Madha
1046	Darfal	Madha	1089	Kumbhej	Madha
1047	Dhavalas	Madha	1090	Kumbhej	Madha
1048	Dhavalas	Madha	1091	Kumbhej	Madha
1049	Dhavalas	Madha	1092	Kurdu	Madha
1050	Dhavalas	Madha	1093	Kurdu	Madha
1051	Dhavalas	Madha	1094	Kurdu	Madha
1052	Dhavalas	Madha	1095	Kurdu	Madha
1053	Dhavalas	Madha	1096	Kurdu	Madha
1054	Footjawalgaon	Madha	1097	Kurdu	Madha
1055	Gar Akole	Madha	1098	Kurdu	Madha
1056	Gar Akole	Madha	1099	Kurdu	Madha
1057	Ghoti	Madha	1100	Kurdu	Madha
1058	Ghoti	Madha	1101	Kurduwadi	Madha
1059	Ghoti	Madha	1102	Lahu	Madha
1060	Hole Kh	Madha	1103	Lahu	Madha
1061	Jadhavwadi	Madha	1104	Lahu	Madha
1062	Jadhavwadi	Madha	1105	Lahu	Madha
1063	Jadhavwadi	Madha	1106	Laul	Madha
1064	Jadhavwadi	Madha	1107	Laul	Madha
1065	Jakhle	Madha	1108	Laul	Madha
1066	Jakhle	Madha	1109	Laul	Madha
1067	Jakhle	Madha	1110	Laul	Madha
1068	Jakhle	Madha	1111	Laul	Madha
1069	Jamgaon	Madha	1112	Laul	Madha
1070	Jamgaon	Madha	1113	Laul	Madha
1071	Jamgaon	Madha	1114	Laul	Madha

S.No	Village	Taluka	S.No	Village	Taluka
1115	Laul	Madha	1158	Nimgaon (Tembhurni)	Madha
1116	Laul	Madha	1159	Nimgaon (Tembhurni)	Madha
1117	Laul	Madha	1160	Nimgaon (Tembhurni)	Madha
1118	Londhewadi	Madha	1161	Padasali	Madha
1119	Madha	Madha	1162	Padasali	Madha
1120	Madha	Madha	1163	Palwan	Madha
1121	Madha	Madha	1164	Palwan	Madha
1122	Madha	Madha	1165	Papnas	Madha
1123	Mahadeowadi	Madha	1166	Parite	Madha
1124	Mahadeowadi	Madha	1167	Pimpalkhunte	Madha
1125	Mahadeowadi	Madha	1168	Pimpalkhunte	Madha
1126	Mahadeowadi	Madha	1169	Pimpalkhunte	Madha
1127	Mahadeowadi	Madha	1170	Pimpalkhunte	Madha
1128	Mahadeowadi	Madha	1171	Pimpalkhunte	Madha
1129	Malegaon	Madha	1172	Pimpalkhunte	Madha
1130	Manegaon	Madha	1173	Pimpalner	Madha
1131	Manegaon	Madha	1174	Pimpalner	Madha
1132	Manegaon	Madha	1175	Pimpalner	Madha
1133	Manegaon	Madha	1176	Pimpalner	Madha
1134	Manegaon	Madha	1177	Pimpalner	Madha
1135	Manegaon	Madha	1178	Pimpalner	Madha
1136	Manegaon	Madha	1179	Pimpalner	Madha
1137	Manegaon	Madha	1180	Pimpalner	Madha
1138	Manegaon	Madha	1181	Ranzani	Madha
1139	Mhaisgaon	Madha	1182	Ridhore	Madha
1140	Mhaisgaon	Madha	1183	Ridhore	Madha
1141	Mhaisgaon	Madha	1184	Ropale Kh	Madha
1142	Mhaisgaon	Madha	1185	Rople Kavhe	Madha
1143	Mhaisgaon	Madha	1186	Rople Kavhe	Madha
1144	Mhaisgaon	Madha	1187	Rople Kavhe	Madha
1145	Mhaisgaon	Madha	1188	Rople Kavhe	Madha
1146	Mhaisgaon	Madha	1189	Rople Kavhe	Madha
1147	Modnimb	Madha	1190	Rople Kavhe	Madha
1148	Modnimb	Madha	1191	Rople Kavhe	Madha
1149	Nagorli	Madha	1192	Rople Kavhe	Madha
1150	Nagorli	Madha	1193	Rople Kavhe	Madha
1151	Nagorli	Madha	1194	Rople Kavhe	Madha
1152	Nagorli	Madha	1195	Rople Kavhe	Madha
1153	Nimgaon (Madha)	Madha	1196	Sapatne (Bhose)	Madha
1154	Nimgaon (Madha)	Madha	1197	Sapatne (Bhose)	Madha
1155	Nimgaon (Madha)	Madha	1198	Sapatne (Bhose)	Madha
1156	Nimgaon (Tembhurni)	Madha	1199	Sapatne (Bhose)	Madha
1157	Nimgaon (Tembhurni)	Madha	1200	Sapatne Tembhorni	Madha

S.No	Village	Taluka	S.No	Village	Taluka
1201	Sapatne Tembhorni	Madha	1244	Tembhorni	Madha
1202	Sapatne Tembhorni	Madha	1245	Tembhorni	Madha
1203	Sapatne Tembhorni	Madha	1246	Tembhorni	Madha
1204	Shedshinge	Madha	1247	Tembhorni	Madha
1205	Shedshinge	Madha	1248	Tembhorni	Madha
1206	Shedshinge	Madha	1249	Tembhorni	Madha
1207	Shedshinge	Madha	1250	Tembhorni	Madha
1208	Shedshinge	Madha	1251	Tembhorni	Madha
1209	Shevare	Madha	1252	Tulshi	Madha
1210	Shevare	Madha	1253	Tulshi	Madha
1211	Shindewadi	Madha	1254	Tulshi	Madha
1212	Shiral Madha	Madha	1255	Tulshi	Madha
1213	Shiral Madha	Madha	1256	Ujani Madha	Madha
1214	Shiral Madha	Madha	1257	Ujani Madha	Madha
1215	Shiral Madha	Madha	1258	Ujani Madha	Madha
1216	Shiral Madha	Madha	1259	Ujani Madha	Madha
1217	Solankarwadi	Madha	1260	Ujani Madha	Madha
1218	Tadavale	Madha	1261	Ujani Madha	Madha
1219	Tadavale	Madha	1262	Ujani Madha	Madha
1220	Tadavale	Madha	1263	Undargaon	Madha
1221	Tadavale	Madha	1264	Undargaon	Madha
1222	Tadavale	Madha	1265	Upalai Bk	Madha
1223	Takali Tembhorni	Madha	1266	Upalai Bk	Madha
1224	Takali Tembhorni	Madha	1267	Upalai Bk	Madha
1225	Takali Tembhorni	Madha	1268	Upalai Bk	Madha
1226	Takali Tembhorni	Madha	1269	Upalai Bk	Madha
1227	Takali Tembhorni	Madha	1270	Upalai Bk	Madha
1228	Takali Tembhorni	Madha	1271	Upalai Bk	Madha
1229	Takali Tembhorni	Madha	1272	Upalai Bk	Madha
1230	Takali Tembhorni	Madha	1273	Upalai Bk	Madha
1231	Takali Tembhorni	Madha	1274	Upalai Bk	Madha
1232	Tambave	Madha	1275	Upalai Kh	Madha
1233	Tandulwadi	Madha	1276	Upalai Kh	Madha
1234	Tandulwadi	Madha	1277	Upalai Kh	Madha
1235	Tandulwadi	Madha	1278	Upalai Kh	Madha
1236	Tandulwadi	Madha	1279	Upalai Kh	Madha
1237	Tembhorni	Madha	1280	Upalawate	Madha
1238	Tembhorni	Madha	1281	Upalawate	Madha
1239	Tembhorni	Madha	1282	Upalawate	Madha
1240	Tembhorni	Madha	1283	Upalawate	Madha
1241	Tembhorni	Madha	1284	Upalawate	Madha
1242	Tembhorni	Madha	1285	Upalawate	Madha
1243	Tembhorni	Madha	1286	Venegaon	Madha

S.No	Village	Taluka	S.No	Village	Taluka
1287	Venegaon	Madha	1330	Fatdari	Malshiras
1288	Venegaon	Madha	1331	Fatdari	Malshiras
1289	Venegaon	Madha	1332	Fondsiras	Malshiras
1290	Vithalwadi	Madha	1333	Fondsiras	Malshiras
1291	Wadachiwadi	Madha	1334	Fondsiras	Malshiras
1292	Wadachiwadi	Madha	1335	Garvad	Malshiras
1293	Wadachiwadi	Madha	1336	Giravi	Malshiras
1294	Wadachiwadi	Madha	1337	Giravi	Malshiras
1295	Wadachiwadi	Madha	1338	Giravi	Malshiras
1296	Wadoli	Madha	1339	Girzani	Malshiras
1297	Wadoli	Madha	1340	Girzani	Malshiras
1298	Wadshinge	Madha	1341	Goradwadi	Malshiras
1299	Wadshinge	Madha	1342	Goradwadi	Malshiras
1300	Wadshinge	Madha	1343	Goradwadi	Malshiras
1301	Wadshinge	Madha	1344	Gursale	Malshiras
1302	Wadshinge	Madha	1345	Islampur	Malshiras
1303	Wadshinge	Madha	1346	Jalbhavi	Malshiras
1304	Wadshinge	Madha	1347	Jalbhavi	Malshiras
1305	Wadshinge	Madha	1348	Kanher	Malshiras
1306	Wadshinge	Madha	1349	Karunde	Malshiras
1307	Wadshinge	Madha	1350	Karunde	Malshiras
1308	Wadshinge	Madha	1351	Karunde	Malshiras
1309	Warawade	Madha	1352	Karunde	Malshiras
1310	Bacheri	Malshiras	1353	Khandali	Malshiras
1311	Bacheri	Malshiras	1354	Khudus	Malshiras
1312	Babhulgaon	Malshiras	1355	Khudus	Malshiras
1313	Bhamburdi	Malshiras	1356	Khudus	Malshiras
1314	Bhamburdi	Malshiras	1357	Kolegaon	Malshiras
1315	Bondale	Malshiras	1358	Kondabavi	Malshiras
1316	Bondale	Malshiras	1359	Kothale	Malshiras
1317	Borgaon	Malshiras	1360	Kothale	Malshiras
1318	Borgaon	Malshiras	1361	Kothale	Malshiras
1319	Chaundeshwarwadi	Malshiras	1362	Kothale	Malshiras
1320	Dahigaon	Malshiras	1363	Kothale	Malshiras
1321	Dahigaon	Malshiras	1364	Kothale	Malshiras
1322	Dasur	Malshiras	1365	Kothale	Malshiras
1323	Dharpuri	Malshiras	1366	Kothale	Malshiras
1324	Dharpuri	Malshiras	1367	Kusmod	Malshiras
1325	Dharpuri	Malshiras	1368	Lonand	Malshiras
1326	Dharpuri	Malshiras	1369	Lonand	Malshiras
1327	Dharpuri	Malshiras	1370	Lonand	Malshiras
1328	Falvani	Malshiras	1371	Mahalung	Malshiras
1329	Fatdari	Malshiras	1372	Mahalung	Malshiras

S.No	Village	Taluka	S.No	Village	Taluka
1373	Malewadi	Malshiras	1416	Shendechinch	Malshiras
1374	Malkhambi	Malshiras	1417	Shingorni	Malshiras
1375	Maloli	Malshiras	1418	Sulewadi	Malshiras
1376	Maloli	Malshiras	1419	Sulewadi	Malshiras
1377	Maloli	Malshiras	1420	Tambave	Malshiras
1378	Malshiras	Malshiras	1421	Tamsidwadi	Malshiras
1379	Malshiras	Malshiras	1422	Tamsidwadi	Malshiras
1380	Malshiras	Malshiras	1423	Tandulwadi	Malshiras
1381	Malshiras	Malshiras	1424	Tandulwadi	Malshiras
1382	Mandaki	Malshiras	1425	Tarangfal	Malshiras
1383	Mandaki	Malshiras	1426	Tarangfal	Malshiras
1384	Mandaki	Malshiras	1427	Tarangfal	Malshiras
1385	Mandave	Malshiras	1428	Velapur	Malshiras
1386	Mandave	Malshiras	1429	Velapur	Malshiras
1387	Medad	Malshiras	1430	Vizori	Malshiras
1388	Morochoi	Malshiras	1431	Water Body	Malshiras
1389	Morochoi	Malshiras	1432	Akole	Mangalvedhe
1390	Motewadi	Malshiras	1433	Andhalgaon	Mangalvedhe
1391	Motewadi	Malshiras	1434	Andhalgaon	Mangalvedhe
1392	Natepute	Malshiras	1435	Andhalgaon	Mangalvedhe
1393	Natepute	Malshiras	1436	Andhalgaon	Mangalvedhe
1394	Natepute	Malshiras	1437	Andhalgaon	Mangalvedhe
1395	Nimgaon	Malshiras	1438	Andhalgaon	Mangalvedhe
1396	Nimgaon	Malshiras	1439	Andhalgaon	Mangalvedhe
1397	Nimgaon	Malshiras	1440	Andhalgaon	Mangalvedhe
1398	Nimgaon	Malshiras	1441	Andhalgaon	Mangalvedhe
1399	Nimgaon	Malshiras	1442	Arali	Mangalvedhe
1400	Nimgaon	Malshiras	1443	Arali	Mangalvedhe
1401	Palasmandal	Malshiras	1444	Arali	Mangalvedhe
1402	Palasmandal	Malshiras	1445	Asabewadi	Mangalvedhe
1403	Pathan Basti	Malshiras	1446	Bathan	Mangalvedhe
1404	Pathan Basti	Malshiras	1447	Bathan	Mangalvedhe
1405	Pathan Basti	Malshiras	1448	Bathan	Mangalvedhe
1406	Piliv	Malshiras	1449	Bathan	Mangalvedhe
1407	Piliv	Malshiras	1450	Bavachi	Mangalvedhe
1408	Pimpari	Malshiras	1451	Bavachi	Mangalvedhe
1409	Pimpari	Malshiras	1452	Bhalwani	Mangalvedhe
1410	Pimpari	Malshiras	1453	Bhalwani	Mangalvedhe
1411	Pirale	Malshiras	1454	Bhalwani	Mangalvedhe
1412	Pisewadi	Malshiras	1455	Bhose	Mangalvedhe
1413	Purandawade	Malshiras	1456	Bhose	Mangalvedhe
1414	Rede	Malshiras	1457	Bhose	Mangalvedhe
1415	Rede	Malshiras	1458	Bhose	Mangalvedhe

S.No	Village	Taluka	S.No	Village	Taluka
1459	Bhose	Mangalvedhe	1502	Gunjegaon	Mangalvedhe
1460	Bhose	Mangalvedhe	1503	Gunjegaon	Mangalvedhe
1461	Bhose	Mangalvedhe	1504	Gunjegaon	Mangalvedhe
1462	Bhose	Mangalvedhe	1505	Hajapur	Mangalvedhe
1463	Bhose	Mangalvedhe	1506	Hajapur	Mangalvedhe
1464	Bhose	Mangalvedhe	1507	Hajapur	Mangalvedhe
1465	Bhose	Mangalvedhe	1508	Hajapur	Mangalvedhe
1466	Bhose	Mangalvedhe	1509	Huljanti	Mangalvedhe
1467	Bhose	Mangalvedhe	1510	Huljanti	Mangalvedhe
1468	Bhose	Mangalvedhe	1511	Huljanti	Mangalvedhe
1469	Borale	Mangalvedhe	1512	Huljanti	Mangalvedhe
1470	Borale	Mangalvedhe	1513	Huljanti	Mangalvedhe
1471	Borale	Mangalvedhe	1514	Hunnar	Mangalvedhe
1472	Bramhapuri	Mangalvedhe	1515	Hunnar	Mangalvedhe
1473	Bramhapuri	Mangalvedhe	1516	Hunnar	Mangalvedhe
1474	Bramhapuri	Mangalvedhe	1517	Hunnar	Mangalvedhe
1475	Chikhalgi	Mangalvedhe	1518	Hunnar	Mangalvedhe
1476	Dhavalas	Mangalvedhe	1519	Hunnar	Mangalvedhe
1477	Dhavalas	Mangalvedhe	1520	Jalihal	Mangalvedhe
1478	Donaj	Mangalvedhe	1521	Jalihal	Mangalvedhe
1479	Donaj	Mangalvedhe	1522	Jalihal	Mangalvedhe
1480	Donaj	Mangalvedhe	1523	Jalihal	Mangalvedhe
1481	Donaj	Mangalvedhe	1524	Jalihal	Mangalvedhe
1482	Donaj	Mangalvedhe	1525	Jalihal	Mangalvedhe
1483	Donaj	Mangalvedhe	1526	Jalihal	Mangalvedhe
1484	Dongargaon	Mangalvedhe	1527	Jangalgi	Mangalvedhe
1485	Dongargaon	Mangalvedhe	1528	Jangalgi	Mangalvedhe
1486	Dongargaon	Mangalvedhe	1529	Jitti	Mangalvedhe
1487	Dongargaon	Mangalvedhe	1530	Jitti	Mangalvedhe
1488	Ganeshwadi	Mangalvedhe	1531	Junoni	Mangalvedhe
1489	Gonewadi	Mangalvedhe	1532	Junoni	Mangalvedhe
1490	Gonewadi	Mangalvedhe	1533	Junoni	Mangalvedhe
1491	Gonewadi	Mangalvedhe	1534	Kacharewadi	Mangalvedhe
1492	Gonewadi	Mangalvedhe	1535	Kacharewadi	Mangalvedhe
1493	Gonewadi	Mangalvedhe	1536	Kacharewadi	Mangalvedhe
1494	Gonewadi	Mangalvedhe	1537	Kacharewadi	Mangalvedhe
1495	Gonewadi	Mangalvedhe	1538	Kacharewadi	Mangalvedhe
1496	Gonewadi	Mangalvedhe	1539	Kagasht	Mangalvedhe
1497	Gunjegaon	Mangalvedhe	1540	Kagasht	Mangalvedhe
1498	Gunjegaon	Mangalvedhe	1541	Kagasht	Mangalvedhe
1499	Gunjegaon	Mangalvedhe	1542	Katral	Mangalvedhe
1500	Gunjegaon	Mangalvedhe	1543	Khadaki	Mangalvedhe
1501	Gunjegaon	Mangalvedhe	1544	Khadaki	Mangalvedhe

S.No	Village	Taluka	S.No	Village	Taluka
1545	Khawe	Mangalvedhe	1588	Lonar	Mangalvedhe
1546	Khomnal	Mangalvedhe	1589	Machanur	Mangalvedhe
1547	Khomnal	Mangalvedhe	1590	Mahamadabad (Hunnar)	Mangalvedhe
1548	Khomnal	Mangalvedhe	1591	Mahamadabad (Hunnar)	Mangalvedhe
1549	Khomnal	Mangalvedhe	1592	Mahamadabad (Hunnar)	Mangalvedhe
1550	Khomnal	Mangalvedhe	1593	Mallewadi	Mangalvedhe
1551	Khupsangi	Mangalvedhe	1594	Mallewadi	Mangalvedhe
1552	Khupsangi	Mangalvedhe	1595	Manewadi	Mangalvedhe
1553	Khupsangi	Mangalvedhe	1596	Manewadi	Mangalvedhe
1554	Khupsangi	Mangalvedhe	1597	Manewadi	Mangalvedhe
1555	Lamantanda	Mangalvedhe	1598	Mangalvedhe	Mangalvedhe
1556	Lamantanda	Mangalvedhe	1599	Mangalvedhe	Mangalvedhe
1557	Lavangi	Mangalvedhe	1600	Mangalvedhe	Mangalvedhe
1558	Lavangi	Mangalvedhe	1601	Mangalvedhe	Mangalvedhe
1559	Lavangi	Mangalvedhe	1602	Mangalvedhe	Mangalvedhe
1560	Lavangi	Mangalvedhe	1603	Mangalvedhe	Mangalvedhe
1561	Lavangi	Mangalvedhe	1604	Mangalvedhe	Mangalvedhe
1562	Laxami Dahiwadi	Mangalvedhe	1605	Mangalvedhe	Mangalvedhe
1563	Laxami Dahiwadi	Mangalvedhe	1606	Mangalvedhe	Mangalvedhe
1564	Laxami Dahiwadi	Mangalvedhe	1607	Mangalvedhe	Mangalvedhe
1565	Laxami Dahiwadi	Mangalvedhe	1608	Mangalvedhe	Mangalvedhe
1566	Laxami Dahiwadi	Mangalvedhe	1609	Mangalvedhe	Mangalvedhe
1567	Laxami Dahiwadi	Mangalvedhe	1610	Mangalvedhe	Mangalvedhe
1568	Laxami Dahiwadi	Mangalvedhe	1611	Mangalvedhe	Mangalvedhe
1569	Laxami Dahiwadi	Mangalvedhe	1612	Mangalvedhe	Mangalvedhe
1570	Laxami Dahiwadi	Mangalvedhe	1613	Mangalvedhe	Mangalvedhe
1571	Laxami Dahiwadi	Mangalvedhe	1614	Mangalvedhe	Mangalvedhe
1572	Laxami Dahiwadi	Mangalvedhe	1615	Mangalvedhe	Mangalvedhe
1573	Laxami Dahiwadi	Mangalvedhe	1616	Mangalvedhe	Mangalvedhe
1574	Lendve Chinchale	Mangalvedhe	1617	Mangalvedhe Urban	Mangalvedhe
1575	Lendve Chinchale	Mangalvedhe	1618	Mangalvedhe Urban	Mangalvedhe
1576	Lendve Chinchale	Mangalvedhe	1619	Mangalvedhe Urban	Mangalvedhe
1577	Lendve Chinchale	Mangalvedhe	1620	Marapur	Mangalvedhe
1578	Lendve Chinchale	Mangalvedhe	1621	Marapur	Mangalvedhe
1579	Lendve Chinchale	Mangalvedhe	1622	Maravade	Mangalvedhe
1580	Lendve Chinchale	Mangalvedhe	1623	Maravade	Mangalvedhe
1581	Lendve Chinchale	Mangalvedhe	1624	Maravade	Mangalvedhe
1582	Lendve Chinchale	Mangalvedhe	1625	Maravade	Mangalvedhe
1583	Lendve Chinchale	Mangalvedhe	1626	Maroli	Mangalvedhe
1584	Lonar	Mangalvedhe	1627	Maroli	Mangalvedhe
1585	Lonar	Mangalvedhe	1628	Maroli	Mangalvedhe
1586	Lonar	Mangalvedhe	1629	Metkarwadi(NV)(15)	Mangalvedhe
1587	Lonar	Mangalvedhe	1630	Mudhavi	Mangalvedhe

S.No	Village	Taluka	S.No	Village	Taluka
1631	Mudhavi	Mangalvedhe	1674	Salagar Kh	Mangalvedhe
1632	Mudhavi	Mangalvedhe	1675	Salagar Kh	Mangalvedhe
1633	Mundhewadi	Mangalvedhe	1676	Salagar Kh	Mangalvedhe
1634	Nandeshwar	Mangalvedhe	1677	Shelewadi	Mangalvedhe
1635	Nandeshwar	Mangalvedhe	1678	Shelewadi	Mangalvedhe
1636	Nandeshwar	Mangalvedhe	1679	Shelewadi	Mangalvedhe
1637	Nandeshwar	Mangalvedhe	1680	Shirashi	Mangalvedhe
1638	Nandeshwar	Mangalvedhe	1681	Shirashi	Mangalvedhe
1639	Nandeshwar	Mangalvedhe	1682	Shirashi	Mangalvedhe
1640	Nandeshwar	Mangalvedhe	1683	Shirashi	Mangalvedhe
1641	Nandur	Mangalvedhe	1684	Shirashi	Mangalvedhe
1642	Nandur	Mangalvedhe	1685	Shirashi	Mangalvedhe
1643	Nandur	Mangalvedhe	1686	Shirashi	Mangalvedhe
1644	Nandur	Mangalvedhe	1687	Shirashi	Mangalvedhe
1645	Nimboni	Mangalvedhe	1688	Shirashi	Mangalvedhe
1646	Nimboni	Mangalvedhe	1689	Shirnadgi	Mangalvedhe
1647	Padolkarwadi	Mangalvedhe	1690	Shirnadgi	Mangalvedhe
1648	Padolkarwadi	Mangalvedhe	1691	Shivangi	Mangalvedhe
1649	Patkhal	Mangalvedhe	1692	Shivangi	Mangalvedhe
1650	Patkhal	Mangalvedhe	1693	Siddapur	Mangalvedhe
1651	Radde	Mangalvedhe	1694	Siddapur	Mangalvedhe
1652	Radde	Mangalvedhe	1695	Siddapur	Mangalvedhe
1653	Radde	Mangalvedhe	1696	Siddapur	Mangalvedhe
1654	Radde	Mangalvedhe	1697	Siddapur	Mangalvedhe
1655	Radde	Mangalvedhe	1698	Siddapur	Mangalvedhe
1656	Radde	Mangalvedhe	1699	Siddapur	Mangalvedhe
1657	Radde	Mangalvedhe	1700	Siddapur	Mangalvedhe
1658	Radde	Mangalvedhe	1701	Soddi	Mangalvedhe
1659	Radde	Mangalvedhe	1702	Soddi	Mangalvedhe
1660	Radde	Mangalvedhe	1703	Soddi	Mangalvedhe
1661	Radde	Mangalvedhe	1704	Soddi	Mangalvedhe
1662	Rahatewadi	Mangalvedhe	1705	Soddi	Mangalvedhe
1663	Revwadi	Mangalvedhe	1706	Soddi	Mangalvedhe
1664	Revwadi	Mangalvedhe	1707	Talsangi	Mangalvedhe
1665	Revwadi	Mangalvedhe	1708	Talsangi	Mangalvedhe
1666	Salagar Bk	Mangalvedhe	1709	Talsangi	Mangalvedhe
1667	Salagar Bk	Mangalvedhe	1710	Talsangi	Mangalvedhe
1668	Salagar Bk	Mangalvedhe	1711	Tandor	Mangalvedhe
1669	Salagar Bk	Mangalvedhe	1712	Tandor	Mangalvedhe
1670	Salagar Bk	Mangalvedhe	1713	Uchethan	Mangalvedhe
1671	Salagar Kh	Mangalvedhe	1714	Yedrav	Mangalvedhe
1672	Salagar Kh	Mangalvedhe	1715	Yedrav	Mangalvedhe
1673	Salagar Kh	Mangalvedhe	1716	Yelagi	Mangalvedhe

S.No	Village	Taluka	S.No	Village	Taluka
1717	Adhegaon	Mohol	1760	Degaon	Mohol
1718	Adhegaon	Mohol	1761	Degaon	Mohol
1719	Angar	Mohol	1762	Degaon	Mohol
1720	Angar	Mohol	1763	Degaon	Mohol
1721	Angar	Mohol	1764	Degaon	Mohol
1722	Angar	Mohol	1765	Degaon	Mohol
1723	Ankoli	Mohol	1766	Deodi	Mohol
1724	Ankoli	Mohol	1767	Deodi	Mohol
1725	Arbali	Mohol	1768	Deodi	Mohol
1726	Arbali	Mohol	1769	Deodi	Mohol
1727	Arjunsond	Mohol	1770	Dhokbabulgaon	Mohol
1728	Arjunsond	Mohol	1771	Dhokbabulgaon	Mohol
1729	Ashte	Mohol	1772	Dhokbabulgaon	Mohol
1730	Ashte	Mohol	1773	Diksal	Mohol
1731	Asti	Mohol	1774	Diksal	Mohol
1732	Asti	Mohol	1775	Diksal	Mohol
1733	Asti	Mohol	1776	Diksal	Mohol
1734	Asti	Mohol	1777	Ekurke	Mohol
1735	Asti	Mohol	1778	Ghatne	Mohol
1736	Asti	Mohol	1779	Ghodeshwar	Mohol
1737	Asti	Mohol	1780	Ghorpadi	Mohol
1738	Asti	Mohol	1781	Ghorpadi	Mohol
1739	Aundhi	Mohol	1782	Ghotewadi	Mohol
1740	Aundhi	Mohol	1783	Haralwadi	Mohol
1741	Aundhi	Mohol	1784	Haralwadi	Mohol
1742	Aundhi	Mohol	1785	Haralwadi	Mohol
1743	Aundhi	Mohol	1786	Hingani (Nipani)	Mohol
1744	Bairagwadi	Mohol	1787	Hingani (Nipani)	Mohol
1745	Bairagwadi	Mohol	1788	Hingani (Nipani)	Mohol
1746	Bhairowadi	Mohol	1789	Hingani (Nipani)	Mohol
1747	Bhairowadi	Mohol	1790	Hiwre	Mohol
1748	Bhambewadi	Mohol	1791	Hiwre	Mohol
1749	Bhambewadi	Mohol	1792	Hiwre	Mohol
1750	Bhoire	Mohol	1793	Hiwre	Mohol
1751	Bhoire	Mohol	1794	Hiwre	Mohol
1752	Bitle	Mohol	1795	Jamgaon Bk	Mohol
1753	Bitle	Mohol	1796	Jamgaon Bk	Mohol
1754	Bitle	Mohol	1797	Jamgaon Bk	Mohol
1755	Bople	Mohol	1798	Kamti Bk	Mohol
1756	Bople	Mohol	1799	Kamti Bk	Mohol
1757	Chincholikati	Mohol	1800	Kamti Bk	Mohol
1758	Chincholikati	Mohol	1801	Kamti Kh	Mohol
1759	Dadapur	Mohol	1802	Kamti Kh	Mohol

S.No	Village	Taluka	S.No	Village	Taluka
1803	Kamti Kh	Mohol	1846	Maslechaudhari	Mohol
1804	Kamti Kh	Mohol	1847	Maslechaudhari	Mohol
1805	Kamti Kh	Mohol	1848	Maslechaudhari	Mohol
1806	Khandali	Mohol	1849	Maslechaudhari	Mohol
1807	Khandali	Mohol	1850	Miri	Mohol
1808	Khandali	Mohol	1851	Mohol	Mohol
1809	Khandali	Mohol	1852	Mohol	Mohol
1810	Khandali	Mohol	1853	Mohol	Mohol
1811	Kharkatne	Mohol	1854	Mohol	Mohol
1812	Khavani	Mohol	1855	Mohol	Mohol
1813	Khavani	Mohol	1856	Mohol	Mohol
1814	Khavani	Mohol	1857	Mohol	Mohol
1815	Khuneshwar	Mohol	1858	Mohol	Mohol
1816	Khuneshwar	Mohol	1859	Morvanchi	Mohol
1817	Khuneshwar	Mohol	1860	Najikpimpari	Mohol
1818	Kolegaon	Mohol	1861	Najikpimpari	Mohol
1819	Konheri	Mohol	1862	Nalbandwadi	Mohol
1820	Konheri	Mohol	1863	Narkhed	Mohol
1821	Konheri	Mohol	1864	Narkhed	Mohol
1822	Korwali	Mohol	1865	Narkhed	Mohol
1823	Korwali	Mohol	1866	Narkhed	Mohol
1824	Korwali	Mohol	1867	Narkhed	Mohol
1825	Korwali	Mohol	1868	Narkhed	Mohol
1826	Kuranwadi	Mohol	1869	Papari	Mohol
1827	Kuranwadi	Mohol	1870	Papari	Mohol
1828	Kuranwadi	Mohol	1871	Papari	Mohol
1829	Kuranwadi	Mohol	1872	Parmeshwar-Pimpri	Mohol
1830	Kuranwadi	Mohol	1873	Parmeshwar-Pimpri	Mohol
1831	Kuranwadi (Ashti)	Mohol	1874	Paslewadi	Mohol
1832	Kuranwadi (Ashti)	Mohol	1875	Patkul	Mohol
1833	Kurul	Mohol	1876	Patkul	Mohol
1834	Kurul	Mohol	1877	Patkul	Mohol
1835	Kurul	Mohol	1878	Pawarwadi	Mohol
1836	Kurul	Mohol	1879	Pawarwadi	Mohol
1837	Kurul	Mohol	1880	Peertakali	Mohol
1838	Kurul	Mohol	1881	Pennur	Mohol
1839	Kurul	Mohol	1882	Pennur	Mohol
1840	Kurul	Mohol	1883	Pennur	Mohol
1841	Kurul	Mohol	1884	Pennur	Mohol
1842	Kurul	Mohol	1885	Pokharapur	Mohol
1843	Laman Tanda	Mohol	1886	Pokharapur	Mohol
1844	Malikpeth	Mohol	1887	Pokharapur	Mohol
1845	Maslechaudhari	Mohol	1888	Pokharapur	Mohol

S.No	Village	Taluka	S.No	Village	Taluka
1889	Pokharapur	Mohol	1932	Waddegaon	Mohol
1890	Pokharapur	Mohol	1933	Wadwal	Mohol
1891	Sarole	Mohol	1934	Wadwal	Mohol
1892	Saundane	Mohol	1935	Wafale	Mohol
1893	Saundane	Mohol	1936	Wafale	Mohol
1894	Sawaleshwar	Mohol	1937	Wafale	Mohol
1895	Sawaleshwar	Mohol	1938	Wafale	Mohol
1896	Sawaleshwar	Mohol	1939	Wafale	Mohol
1897	Sayyadwarwade	Mohol	1940	Wafale	Mohol
1898	Sayyadwarwade	Mohol	1941	Wagholi	Mohol
1899	Sayyadwarwade	Mohol	1942	Wagholi	Mohol
1900	Sayyadwarwade	Mohol	1943	Wagholi	Mohol
1901	Shejbabhulgaon	Mohol	1944	Wagholiwadi	Mohol
1902	Shejbabhulgaon	Mohol	1945	Warkute	Mohol
1903	Shetphal	Mohol	1946	Warkute	Mohol
1904	Shetphal	Mohol	1947	Water Body	Mohol
1905	Shetphal	Mohol	1948	Water Body	Mohol
1906	Shetphal	Mohol	1949	Water Body	Mohol
1907	Shirapur(Solapur)	Mohol	1950	Watwate	Mohol
1908	Shirapur(Solapur)	Mohol	1951	Watwate	Mohol
1909	Shirapur(Solapur)	Mohol	1952	Watwate	Mohol
1910	Shirapur(Solapur)	Mohol	1953	Watwate	Mohol
1911	Siddewadi	Mohol	1954	Wirawade Bk	Mohol
1912	Sohale	Mohol	1955	Yawali	Mohol
1913	Sohale	Mohol	1956	Yawali	Mohol
1914	Sohale	Mohol	1957	Yawali	Mohol
1915	Takali (Shikandar)	Mohol	1958	Yawali	Mohol
1916	Tambole	Mohol	1959	Yellamwadi	Mohol
1917	Tambole	Mohol	1960	Yenaki	Mohol
1918	Tambole	Mohol	1961	Yenaki	Mohol
1919	Tambole	Mohol	1962	Adhiv	Pandharpur
1920	Tambole	Mohol	1963	Adhiv	Pandharpur
1921	Telangwadi	Mohol	1964	Ambe	Pandharpur
1922	Telangwadi	Mohol	1965	Ambe	Pandharpur
1923	Valuj	Mohol	1966	Ambe	Pandharpur
1924	Valuj	Mohol	1967	Ambe	Pandharpur
1925	Valuj	Mohol	1968	Ambe	Pandharpur
1926	Valuj	Mohol	1969	Ambechincholi	Pandharpur
1927	Valuj	Mohol	1970	Anawali	Pandharpur
1928	Valuj	Mohol	1971	Anawali	Pandharpur
1929	Valuj	Mohol	1972	Anawali	Pandharpur
1930	Valuj	Mohol	1973	Anawali	Pandharpur
1931	Valuj	Mohol	1974	Anawali	Pandharpur

S.No	Village	Taluka	S.No	Village	Taluka
1975	Avhe	Pandharpur	2018	Gadegaon	Pandharpur
1976	Avhe	Pandharpur	2019	Gadegaon	Pandharpur
1977	Babhulgaon	Pandharpur	2020	Gardi	Pandharpur
1978	Babhulgaon	Pandharpur	2021	Gardi	Pandharpur
1979	Babhulgaon	Pandharpur	2022	Gardi	Pandharpur
1980	Badalkot	Pandharpur	2023	Gardi	Pandharpur
1981	Bardi	Pandharpur	2024	Gopalpur	Pandharpur
1982	Bardi	Pandharpur	2025	Gurasale	Pandharpur
1983	Bardi	Pandharpur	2026	Gurasale	Pandharpur
1984	Bardi	Pandharpur	2027	Gurasale	Pandharpur
1985	Bhalawani	Pandharpur	2028	Gurasale	Pandharpur
1986	Bhalawani	Pandharpur	2029	Hole	Pandharpur
1987	Bhalawani	Pandharpur	2030	Hole	Pandharpur
1988	Bhandi Shegaon	Pandharpur	2031	Ishwar Wathar	Pandharpur
1989	Bhandi Shegaon	Pandharpur	2032	Jadhavwadi	Pandharpur
1990	Bhandi Shegaon	Pandharpur	2033	Jadhavwadi	Pandharpur
1991	Bhandi Shegaon	Pandharpur	2034	Jadhavwadi	Pandharpur
1992	Bhandi Shegaon	Pandharpur	2035	Jainwadi	Pandharpur
1993	Bhandi Shegaon	Pandharpur	2036	Jaloli	Pandharpur
1994	Bhatumbare	Pandharpur	2037	Jaloli	Pandharpur
1995	Bhose	Pandharpur	2038	Karkamb	Pandharpur
1996	Bhose	Pandharpur	2039	Karkamb	Pandharpur
1997	Bhose	Pandharpur	2040	Karkamb	Pandharpur
1998	Bhose	Pandharpur	2041	Karkamb	Pandharpur
1999	Bhose	Pandharpur	2042	Karkamb	Pandharpur
2000	Bhose	Pandharpur	2043	Karkamb	Pandharpur
2001	Bohali	Pandharpur	2044	Karkamb	Pandharpur
2002	Bohali	Pandharpur	2045	Karkamb	Pandharpur
2003	Bohali	Pandharpur	2046	Karole	Pandharpur
2004	Chale	Pandharpur	2047	Kasegaon	Pandharpur
2005	Chilaiwadi	Pandharpur	2048	Kasegaon	Pandharpur
2006	Chincholi Bhose	Pandharpur	2049	Kasegaon	Pandharpur
2007	Degaon	Pandharpur	2050	Kasegaon	Pandharpur
2008	Degaon	Pandharpur	2051	Kasegaon	Pandharpur
2009	Degaon	Pandharpur	2052	Kasegaon	Pandharpur
2010	Degaon	Pandharpur	2053	Kasegaon	Pandharpur
2011	Dhondewadi	Pandharpur	2054	Kasegaon	Pandharpur
2012	Eklaspur	Pandharpur	2055	Kasegaon	Pandharpur
2013	Eklaspur	Pandharpur	2056	Kasegaon	Pandharpur
2014	Fulchincholi	Pandharpur	2057	Kasegaon	Pandharpur
2015	Fulchincholi	Pandharpur	2058	Kasegaon	Pandharpur
2016	Gadegaon	Pandharpur	2059	Kauthali	Pandharpur
2017	Gadegaon	Pandharpur	2060	Kauthali	Pandharpur

S.No	Village	Taluka	S.No	Village	Taluka
2061	Keskarwadi	Pandharpur	2104	Palshi	Pandharpur
2062	Keskarwadi	Pandharpur	2105	Palshi	Pandharpur
2063	Kharatwadi	Pandharpur	2106	Pandharewadi	Pandharpur
2064	Kharatwadi	Pandharpur	2107	Pandharewadi	Pandharpur
2065	Khardi	Pandharpur	2108	Patvardhan Kuroli	Pandharpur
2066	Khardi	Pandharpur	2109	Patvardhan Kuroli	Pandharpur
2067	Khardi	Pandharpur	2110	Patvardhan Kuroli	Pandharpur
2068	Khardi	Pandharpur	2111	Patvardhan Kuroli	Pandharpur
2069	Khardi	Pandharpur	2112	Pehe	Pandharpur
2070	Khed Bhalawani	Pandharpur	2113	Pehe	Pandharpur
2071	Khed Bhalawani	Pandharpur	2114	Phandarpur	Pandharpur
2072	Khed Bhoose	Pandharpur	2115	Phandarpur	Pandharpur
2073	Khed Bhoose	Pandharpur	2116	Phandarpur	Pandharpur
2074	Khed Bhoose	Pandharpur	2117	Pirachi Kuroli	Pandharpur
2075	Korty	Pandharpur	2118	Pirachi Kuroli	Pandharpur
2076	Korty	Pandharpur	2119	Pirachi Kuroli	Pandharpur
2077	Korty	Pandharpur	2120	Pohargaon	Pandharpur
2078	Korty	Pandharpur	2121	Pohargaon	Pandharpur
2079	Korty	Pandharpur	2122	Puluj	Pandharpur
2080	Lonarwadi	Pandharpur	2123	Puluj	Pandharpur
2081	Lonarwadi	Pandharpur	2124	Puluj	Pandharpur
2082	Magarwadi	Pandharpur	2125	Puluj	Pandharpur
2083	Magarwadi	Pandharpur	2126	Puluj	Pandharpur
2084	Mendhapur	Pandharpur	2127	Pulujwadi	Pandharpur
2085	Mendhapur	Pandharpur	2128	Ranzani	Pandharpur
2086	Mendhapur	Pandharpur	2129	Ranzani	Pandharpur
2087	Mendhapur	Pandharpur	2130	Ranzani	Pandharpur
2088	Mendhapur	Pandharpur	2131	Ranzani	Pandharpur
2089	Mendhapur	Pandharpur	2132	Ranzani	Pandharpur
2090	Mendhapur	Pandharpur	2133	Ropale	Pandharpur
2091	Mendhapur	Pandharpur	2134	Ropale	Pandharpur
2092	Mundhewadi	Pandharpur	2135	Ropale	Pandharpur
2093	Nandore	Pandharpur	2136	Sarkoli	Pandharpur
2094	Narayan Chincholi	Pandharpur	2137	Sarkoli	Pandharpur
2095	Nematwadi	Pandharpur	2138	Shankargaon	Pandharpur
2096	Nematwadi	Pandharpur	2139	Shelve	Pandharpur
2097	Nepatgaon	Pandharpur	2140	Shelve	Pandharpur
2098	Ozewadi	Pandharpur	2141	Shelve	Pandharpur
2099	Palshi	Pandharpur	2142	Shetphal	Pandharpur
2100	Palshi	Pandharpur	2143	Shetphal	Pandharpur
2101	Palshi	Pandharpur	2144	Shevate	Pandharpur
2102	Palshi	Pandharpur	2145	Shevate	Pandharpur
2103	Palshi	Pandharpur	2146	Shevate	Pandharpur

S.No	Village	Taluka	S.No	Village	Taluka
2147	Shevate	Pandharpur	2190	Akola	Sangole
2148	Shevate	Pandharpur	2191	Akola	Sangole
2149	Shirdhon	Pandharpur	2192	Akola	Sangole
2150	Shirgaon	Pandharpur	2193	Alegaon	Sangole
2151	Shirgaon	Pandharpur	2194	Alegaon	Sangole
2152	Sonake	Pandharpur	2195	Alegaon	Sangole
2153	Sonake	Pandharpur	2196	Ankadhal	Sangole
2154	Supli	Pandharpur	2197	Bagalwadi	Sangole
2155	Supli	Pandharpur	2198	Bagalwadi	Sangole
2156	Suste	Pandharpur	2199	Balvadi	Sangole
2157	Takli	Pandharpur	2200	Bamani	Sangole
2158	Takli	Pandharpur	2201	Bamani	Sangole
2159	Takli	Pandharpur	2202	Bandgarwadi	Sangole
2160	Tarapur	Pandharpur	2203	Bandgarwadi(N.V.)	Sangole
2161	Tarapur	Pandharpur	2204	Bandgarwadi(N.V.)	Sangole
2162	Tarapur	Pandharpur	2205	Bhopasewadi	Sangole
2163	Taratgaon Kasegaon	Pandharpur	2206	Bhopasewadi	Sangole
2164	Taratgaon Kasegaon	Pandharpur	2207	Bhopasewadi	Sangole
2165	Taratgaon Kasegaon	Pandharpur	2208	Bhopasewadi	Sangole
2166	Taratgaon(Bhose)	Pandharpur	2209	Buralewadi	Sangole
2167	Tavashi	Pandharpur	2210	Buralewadi	Sangole
2168	Tavashi	Pandharpur	2211	Buralewadi	Sangole
2169	Tavashi	Pandharpur	2212	Burangewadi	Sangole
2170	Tavashi	Pandharpur	2213	Burangewadi	Sangole
2171	Tisangi	Pandharpur	2214	Chikmahud	Sangole
2172	Tungat	Pandharpur	2215	Chikmahud	Sangole
2173	Tungat	Pandharpur	2216	Chikmahud	Sangole
2174	Tungat	Pandharpur	2217	Chinake	Sangole
2175	Umbare	Pandharpur	2218	Chincholi	Sangole
2176	Umbare	Pandharpur	2219	Chincholi	Sangole
2177	Umbargaon	Pandharpur	2220	Chopadi	Sangole
2178	Upari	Pandharpur	2221	Chopadi	Sangole
2179	Upari	Pandharpur	2222	Chopadi	Sangole
2180	Wakhari	Pandharpur	2223	Chopadi	Sangole
2181	Wakhari	Pandharpur	2224	Chopadi	Sangole
2182	Wakhari	Pandharpur	2225	Devale	Sangole
2183	Achakadani	Sangole	2226	Devale	Sangole
2184	Aglavewadi	Sangole	2227	Dhalewadi(NV-8)	Sangole
2185	Aglavewadi	Sangole	2228	Dhayati	Sangole
2186	Ajanale	Sangole	2229	Diksal	Sangole
2187	Ajanale	Sangole	2230	Diksal	Sangole
2188	Ajanale	Sangole	2231	Diksal	Sangole
2189	Akola	Sangole	2232	Diksal	Sangole

S.No	Village	Taluka	S.No	Village	Taluka
2233	Diksal	Sangole	2276	Javala	Sangole
2234	Dongargaon	Sangole	2277	Javala	Sangole
2235	Dongargaon	Sangole	2278	Jujarpur	Sangole
2236	Dongargaon	Sangole	2279	Jujarpur	Sangole
2237	Dongargaon	Sangole	2280	Jujarpur	Sangole
2238	Ekhatapur	Sangole	2281	Junoni	Sangole
2239	Ekhatapur	Sangole	2282	Junoni	Sangole
2240	Ekhatapur	Sangole	2283	Junoni	Sangole
2241	Gaygavhan	Sangole	2284	Kadlas	Sangole
2242	Gaygavhan	Sangole	2285	Kadlas	Sangole
2243	Gheradi	Sangole	2286	Kadlas	Sangole
2244	Gheradi	Sangole	2287	Kadlas	Sangole
2245	Gheradi	Sangole	2288	Kadlas	Sangole
2246	Gheradi	Sangole	2289	Kalubaluwadi	Sangole
2247	Gheradi	Sangole	2290	Kalubaluwadi	Sangole
2248	Gheradi	Sangole	2291	Kalubaluwadi	Sangole
2249	Gheradi	Sangole	2292	Kalubaluwadi	Sangole
2250	Gheradi	Sangole	2293	Kamlapur	Sangole
2251	Gheradi	Sangole	2294	Kamlapur	Sangole
2252	Gheradi	Sangole	2295	Karadwadi	Sangole
2253	Godasewadi (NV-37)	Sangole	2296	Karadwadi	Sangole
2254	Godasewadi (NV-37)	Sangole	2297	Karandewadi(NV-53)	Sangole
2255	Habisewadi	Sangole	2298	Karandewadi(NV-53)	Sangole
2256	Habisewadi	Sangole	2299	Karandewadi(NV-7)	Sangole
2257	Haldahivadi	Sangole	2300	Katfal	Sangole
2258	Hangirage	Sangole	2301	Katfal	Sangole
2259	Hangirage	Sangole	2302	Katfal	Sangole
2260	Hangirage	Sangole	2303	Katfal	Sangole
2261	Hanmantgaon	Sangole	2304	Katfal	Sangole
2262	Hanmantgaon	Sangole	2305	Katfal	Sangole
2263	Hanmantgaon	Sangole	2306	Katfal	Sangole
2264	Hatid	Sangole	2307	Katfal	Sangole
2265	Hatkar Mangewadi	Sangole	2308	Katfal	Sangole
2266	Hatkar Mangewadi	Sangole	2309	Kedarwadi (NV-38)	Sangole
2267	Hatkar Mangewadi	Sangole	2310	Khavaspur	Sangole
2268	Itaki	Sangole	2311	Khavaspur	Sangole
2269	Itaki	Sangole	2312	Khavaspur	Sangole
2270	Itaki	Sangole	2313	Khilarwadi	Sangole
2271	Itaki	Sangole	2314	Kidabisari	Sangole
2272	Jadhavwadi(N.V.)	Sangole	2315	Kidabisari	Sangole
2273	Jadhavwadi(N.V.)	Sangole	2316	Kole	Sangole
2274	Javala	Sangole	2317	Kole	Sangole
2275	Javala	Sangole	2318	Kole	Sangole

S.No	Village	Taluka	S.No	Village	Taluka
2319	Kole	Sangole	2362	Rajuri	Sangole
2320	Kole	Sangole	2363	Rajuri	Sangole
2321	Kole	Sangole	2364	Salagarwadi(NV-49)	Sangole
2322	Kombadwadi	Sangole	2365	Sangewadi	Sangole
2323	Ligadewadi	Sangole	2366	Sangewadi	Sangole
2324	Ligadewadi	Sangole	2367	Sangole	Sangole
2325	Ligadewadi	Sangole	2368	Sangole	Sangole
2326	Ligadewadi	Sangole	2369	Sangole	Sangole
2327	Lonavire	Sangole	2370	Sangole	Sangole
2328	Lonavire	Sangole	2371	Sangole	Sangole
2329	Lonavire	Sangole	2372	Sangole	Sangole
2330	Lotewadi	Sangole	2373	Sangole	Sangole
2331	Lotewadi	Sangole	2374	Save	Sangole
2332	Mahim	Sangole	2375	Save	Sangole
2333	Mahim	Sangole	2376	Save	Sangole
2334	Mahim	Sangole	2377	Shirbavi	Sangole
2335	Mahud Bk	Sangole	2378	Shirbavi	Sangole
2336	Mahud Bk	Sangole	2379	Shivane	Sangole
2337	Mahud Bk	Sangole	2380	Shivane	Sangole
2338	Mahud Bk	Sangole	2381	Shivane	Sangole
2339	Mahud Bk	Sangole	2382	Shivane	Sangole
2340	Mahud Bk	Sangole	2383	Shivane	Sangole
2341	Mahud Bk	Sangole	2384	Shivane	Sangole
2342	Manegaon	Sangole	2385	Sonalwadi	Sangole
2343	Medsingi	Sangole	2386	Sonalwadi	Sangole
2344	Medsingi	Sangole	2387	Sonalwadi	Sangole
2345	Metakarwadi	Sangole	2388	Sonand	Sangole
2346	Metakarwadi	Sangole	2389	Sonand	Sangole
2347	Misalwadi(NV-81)	Sangole	2390	Sonand	Sangole
2348	Nalvadewadi(NV)(81)	Sangole	2391	Sonand	Sangole
2349	Narale	Sangole	2392	Tarangewadi	Sangole
2350	Narale	Sangole	2393	Tippehali	Sangole
2351	Nazare	Sangole	2394	Tippehali	Sangole
2352	Pachegaon Bk	Sangole	2395	Tippehali	Sangole
2353	Pachegaon Bk	Sangole	2396	Tippehali	Sangole
2354	Pachegaon Bk	Sangole	2397	Tippehali	Sangole
2355	Pachegaon Bk	Sangole	2398	Udanwadi	Sangole
2356	Pachegaon Bk	Sangole	2399	Vazare	Sangole
2357	Pachegaon Kh	Sangole	2400	Vazare	Sangole
2358	Pare	Sangole	2401	Wadegaon	Sangole
2359	Pare	Sangole	2402	Wadegaon	Sangole
2360	Pare	Sangole	2403	Wadegaon	Sangole
2361	Rajuri	Sangole	2404	Waki Gherdi	Sangole

S.No	Village	Taluka	S.No	Village	Taluka
2405	Wani Chinchol	Sangole	2448	Hiraj	Solapur North
2406	Wani Chinchol	Sangole	2449	Hiraj	Solapur North
2407	Wani Chinchol	Sangole	2450	Honsal	Solapur North
2408	Watambre	Sangole	2451	Honsal	Solapur North
2409	Watambre	Sangole	2452	Inchgaon	Solapur North
2410	Watambre	Sangole	2453	Inchgaon	Solapur North
2411	Yelmar Mangewadi	Sangole	2454	Kalman	Solapur North
2412	Yelmar Mangewadi	Sangole	2455	Kalman	Solapur North
2413	Yelmar Mangewadi	Sangole	2456	Kalman	Solapur North
2414	Yelmar Mangewadi	Sangole	2457	Kalman	Solapur North
2415	Zapachiwadi(NV-55)	Sangole	2458	Kalman	Solapur North
2416	Akolekati	Solapur North	2459	Kalman	Solapur North
2417	Akolekati	Solapur North	2460	Karamba	Solapur North
2418	Akolekati	Solapur North	2461	Karamba	Solapur North
2419	Akolekati	Solapur North	2462	Karamba	Solapur North
2420	Akolekati	Solapur North	2463	Karamba	Solapur North
2421	Bale	Solapur North	2464	Karamba	Solapur North
2422	Bale	Solapur North	2465	Kawathe	Solapur North
2423	Belati	Solapur North	2466	Kegaon	Solapur North
2424	Belati	Solapur North	2467	Khed	Solapur North
2425	Bhatewadi	Solapur North	2468	Kondi	Solapur North
2426	Bhatewadi	Solapur North	2469	Kondi	Solapur North
2427	Dahitane	Solapur North	2470	Kondi	Solapur North
2428	Dahitane	Solapur North	2471	Kondi	Solapur North
2429	Dahitane	Solapur North	2472	Kondi	Solapur North
2430	Dahitane	Solapur North	2473	Kondi	Solapur North
2431	Dahitane	Solapur North	2474	Kouthali	Solapur North
2432	Darfal (Bibi)	Solapur North	2475	Kouthali	Solapur North
2433	Darfal (Bibi)	Solapur North	2476	Kumathe	Solapur North
2434	Darfal (Bibi)	Solapur North	2477	Kumathe	Solapur North
2435	Darphal (Gawadi)	Solapur North	2478	Kumathe	Solapur North
2436	Darphal (Gawadi)	Solapur North	2479	Kumathe	Solapur North
2437	Degaon	Solapur North	2480	Majrewadi	Solapur North
2438	Degaon	Solapur North	2481	Majrewadi	Solapur North
2439	Degaon	Solapur North	2482	Majrewadi	Solapur North
2440	Degaon	Solapur North	2483	Majrewadi	Solapur North
2441	Degaon	Solapur North	2484	Mardi	Solapur North
2442	Dongaon	Solapur North	2485	Mardi	Solapur North
2443	Dongaon	Solapur North	2486	Mardi	Solapur North
2444	Gulwanchi	Solapur North	2487	Mardi	Solapur North
2445	Gulwanchi	Solapur North	2488	Nannaj	Solapur North
2446	Gulwanchi	Solapur North	2489	Nannaj	Solapur North
2447	Hiraj	Solapur North	2490	Nannaj	Solapur North

S.No	Village	Taluka	S.No	Village	Taluka
2491	Nannaj	Solapur North	2534	Telgaon	Solapur North
2492	Nannaj	Solapur North	2535	Tirhe	Solapur North
2493	Narotewadi	Solapur North	2536	Tirhe	Solapur North
2494	Narotewadi	Solapur North	2537	Tirhe	Solapur North
2495	Narotewadi	Solapur North	2538	Wadala	Solapur North
2496	Padsali	Solapur North	2539	Wadala	Solapur North
2497	Padsali	Solapur North	2540	Wadala	Solapur North
2498	Pakani	Solapur North	2541	Wangi	Solapur North
2499	Pakani	Solapur North	2542	Wangi	Solapur North
2500	Pakani	Solapur North	2543	Wangi	Solapur North
2501	Pathari	Solapur North	2544	Achegaon	Solapur South
2502	Pathari	Solapur North	2545	Achegaon	Solapur South
2503	Pathari	Solapur North	2546	Achegaon	Solapur South
2504	Pathari	Solapur North	2547	Aherwadi	Solapur South
2505	Pratapnagar(NV-29)	Solapur North	2548	Aherwadi	Solapur South
2506	Pratapnagar(NV-29)	Solapur North	2549	Ahtroli	Solapur South
2507	Pratapnagar(NV-29)	Solapur North	2550	Ahtroli	Solapur South
2508	Pratapnagar(NV-29)	Solapur North	2551	Akole Mandrup	Solapur South
2509	Pratapnagar(NV-29)	Solapur North	2552	Alegaon	Solapur South
2510	Raleras	Solapur North	2553	Auj Aherwadi	Solapur South
2511	Ranmasle	Solapur North	2554	Auj Mandrup	Solapur South
2512	Ranmasle	Solapur North	2555	Aurad	Solapur South
2513	Ranmasle	Solapur North	2556	Aurad	Solapur South
2514	Ranmasle	Solapur North	2557	Aurad	Solapur South
2515	Ranmasle	Solapur North	2558	Bandalgi	Solapur South
2516	Ranmasle	Solapur North	2559	Basav Nagar (NV-58)	Solapur South
2517	Ranmasle	Solapur North	2560	Bhandar Kavathe	Solapur South
2518	Sevalalnagar	Solapur North	2561	Bhandar Kavathe	Solapur South
2519	Sevalalnagar	Solapur North	2562	Bhandar Kavathe	Solapur South
2520	Shelgi	Solapur North	2563	Bhandar Kavathe	Solapur South
2521	Shivani	Solapur North	2564	Bhandar Kavathe	Solapur South
2522	Solapur	Solapur North	2565	Bhandar Kavathe	Solapur South
2523	Solapur	Solapur North	2566	Bolkavathe	Solapur South
2524	Solapur	Solapur North	2567	Boramani	Solapur South
2525	Solapur	Solapur North	2568	Boramani	Solapur South
2526	Solapur	Solapur North	2569	Boramani	Solapur South
2527	Solapur(Rural)	Solapur North	2570	Boramani	Solapur South
2528	Soregaon	Solapur North	2571	Boramani	Solapur South
2529	Soregaon	Solapur North	2572	Boramani	Solapur South
2530	Soregaon	Solapur North	2573	Borul	Solapur South
2531	Telgaon	Solapur North	2574	Borul	Solapur South
2532	Telgaon	Solapur North	2575	Chandahal	Solapur South
2533	Telgaon	Solapur North	2576	Chincholi	Solapur South

S.No	Village	Taluka	S.No	Village	Taluka
2577	Chinchpur	Solapur South	2620	Kumbhari	Solapur South
2578	Darganhalli	Solapur South	2621	Kumbhari	Solapur South
2579	Darganhalli	Solapur South	2622	Kumbhari	Solapur South
2580	Darganhalli	Solapur South	2623	Kumbhari	Solapur South
2581	Dhotri	Solapur South	2624	Kumbhari	Solapur South
2582	Dhotri	Solapur South	2625	Kusur	Solapur South
2583	Dhotri	Solapur South	2626	Malkvathe	Solapur South
2584	Dhotri	Solapur South	2627	Mandrup	Solapur South
2585	Dindur	Solapur South	2628	Mandrup	Solapur South
2586	Doddi	Solapur South	2629	Mandrup	Solapur South
2587	Gangewadi	Solapur South	2630	Mandrup	Solapur South
2588	Gaunjegaon	Solapur South	2631	Mandrup	Solapur South
2589	Gavadewadi(NV-76)	Solapur South	2632	Mandrup	Solapur South
2590	Hanamgaon	Solapur South	2633	Mandrup	Solapur South
2591	Hanamgaon	Solapur South	2634	Mandrup	Solapur South
2592	Hatur	Solapur South	2635	Mandrup	Solapur South
2593	Hatur	Solapur South	2636	Mandrup	Solapur South
2594	Hatur	Solapur South	2637	Mandrup	Solapur South
2595	Hatur	Solapur South	2638	Mandrup	Solapur South
2596	Honmurgi	Solapur South	2639	Mandrup	Solapur South
2597	Honmurgi	Solapur South	2640	Mandrup	Solapur South
2598	Hotgi	Solapur South	2641	Mangoli	Solapur South
2599	Ingalgi	Solapur South	2642	Mangoli	Solapur South
2600	Kanbas	Solapur South	2643	Mulegaon	Solapur South
2601	Kanbas	Solapur South	2644	Musti	Solapur South
2602	Kanbas	Solapur South	2645	Musti	Solapur South
2603	Kandalgaon	Solapur South	2646	Musti	Solapur South
2604	Kandalgaon	Solapur South	2647	Musti	Solapur South
2605	Kandalgaon	Solapur South	2648	Musti	Solapur South
2606	Kandalgaon	Solapur South	2649	Musti	Solapur South
2607	Kandalgaon	Solapur South	2650	Nandani	Solapur South
2608	Kandalgaon	Solapur South	2651	Nandani	Solapur South
2609	Kandalgaon	Solapur South	2652	Nimbargi	Solapur South
2610	Kandehalli	Solapur South	2653	Nimbargi	Solapur South
2611	Kandehalli	Solapur South	2654	Nimbargi	Solapur South
2612	Kandehalli	Solapur South	2655	Phatatewadi	Solapur South
2613	Karkal	Solapur South	2656	Rampur	Solapur South
2614	Kasegaon	Solapur South	2657	Sangdari	Solapur South
2615	Kasegaon	Solapur South	2658	Sangdari	Solapur South
2616	Kasegaon	Solapur South	2659	Sanjwad	Solapur South
2617	Kasegaon	Solapur South	2660	Sanjwad	Solapur South
2618	Kumbhari	Solapur South	2661	Shingadgaon	Solapur South
2619	Kumbhari	Solapur South	2662	Shingadgaon	Solapur South

S.No	Village	Taluka
2663	Shirpanhalli	Solapur South
2664	Sindkhed	Solapur South
2665	Takali	Solapur South
2666	Tandulwadi	Solapur South
2667	Tandulwadi	Solapur South
2668	Telgaon Mandrup	Solapur South
2669	Tillehal	Solapur South
2670	Tillehal	Solapur South
2671	Tirth	Solapur South
2672	Togarhalli	Solapur South
2673	Vadapur	Solapur South
2674	Valsang	Solapur South
2675	Valsang	Solapur South
2676	Valsang	Solapur South
2677	Vinchur	Solapur South
2678	Vinchur	Solapur South
2679	Vinchur	Solapur South
2680	Vinchur	Solapur South
2681	Wadgaon	Solapur South
2682	Wadji	Solapur South
2683	Wangi	Solapur South
2684	Wangi	Solapur South
2685	Wangi	Solapur South
2686	Wangi	Solapur South
2687	Waralegaon	Solapur South
2688	Yelegaon	Solapur South
2689	Yelegaon	Solapur South
2690	Yetnal	Solapur South

PROPOSED MANAGEMENT PLAN



Augmentation by AR – 201.7 MCM

Aquifer I Resources –
Dynamic: 1372.67 MCM
In Storage: 96.6 MCM

Aquifer II Resources –
251.62 MCM

GW quantum saved by WUE – 193.06 MCM

Total Draft – 1075.75 MCM



GW SENAREO AFTER IMPLEMENTING Artificial Recharge & available GWR to bring SOD UPTO 70%

GWA 1372.67 MCM + 201.70 MCM by AR = 1574.37 MCM

GWR available to develop up to 70% = 93.81MCM

Ground Water Management

GW saved by WUE measures: 193.06 MCM.

GWR available for Development after bringing stage of GWD up to 70% = 219.37 MCM

PROBABLE BENEFITS AFTER IMPLEMENTING AR & WUE MEASURES

- Bringing down to STAGE OF GW DEVELOPMENT to 72 % in Mohol and below 70% in remaining talukas from Present stage of GW development of with enhance availability of GWR after supply side & Demand side intervention,
- Beside this, about 337.49 Sq.Km of additional Area can also be brought under assured GW irrigation from 219.37 MCM of Balance GWR available for GW Development after STAGE OF GWD is brought to 70% (safe category)